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ABSTRACT

The final report describes activities of Project REACH (Research on the Early Abilities of Children with Handicaps). Introductory sections provide information on the institute's mission, objectives, and activities as well as on its administrative organization. Five major research areas are identified and discussed (sample subtopics in parentheses): infant toddler studies (child characteristics, mother-child interactions, assessments); preschool studies (motivation, temperament, attribution, social competence, attention); support systems (parents' use of resources); documentation of progress (adequacy of assessment instruments, use of alternative analyses); and a longitudinal study of 69 children between the ages of 18 and 42 months who were either at risk for delay because of problems in the perinatal period, or who exhibited mild to moderate developmental delay in one or more areas. Also included in the report are lists of project products, dissemination and training activities, project personnel, and an analysis of the program's impact. (CL)

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PROJECT REACH

Research on Early Abilities of Children with Handicaps

1977–1982

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FINAL REPORT

University of California, Los Angeles

EC151014

vol 2

FINAL REPORT

PROJECT REACH

Research on the Early Abilities of Children with Handicaps

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Graduate School of Education

University of California, Los Angeles

Research funded under Contract #300-77-0306 between the University of California and the Bureau of Education for the Handicapped, U.S. Office of Education, Washington, DC.

7-1-77 to 6-30-82

Part I

ABSTRACT

Project REACH was one of four Early Childhood Research Institutes funded by the Bureau of Education for the Handicapped/Office of Special Education for the period July 1, 1977 through June 30, 1982. REACH was housed in the Graduate School of Education of the University of California, Los Angeles (UCLA). The Project was directed by Barbara K. Keogh and Claire B. Kopp, and included specific programs of research carried out by UCLA faculty members K. Chan, P. Greenfield, A. Krupski, G. Mahoney, D. Stipek, as well as by the two Principal Investigators. The research program was embedded in the UCLA training programs so that research assistants and associates were for the most part undergraduate and graduate students and postdoctoral fellows. Research was organized to use cross sectional and longitudinal strategies and was conducted within three primary research projects: Infant Studies, Preschool Studies, and a Longitudinal Study bridging the two age groups. Topics for study included child characteristics of cognition, attention, language, motivation, temperament, and attribution. Related topics included studies of parents, families, resources, and interventions, as well as work on methods for the documentation of progress. A heavy emphasis on dissemination, especially in the last years of REACH, led to over 25 chapters, books, or monographs; over 75 articles, reviews, or proceedings; and 10 working papers. More than 250 presentations have been made at conferences, workshops, and professional meetings. Taken as a whole, the yield from five years of REACH work has been extensive. Another aspect of impact deserves note, however. While an additive model of productivity provides certain information, the summarizing numbers may not in the long run reflect the more important dimensions of impact generated by REACH. In our view, the findings in REACH studies and the experiences of the investigators within the Project have had far reaching effects on several sets of people: REACH faculty and students, colleagues in the University, professionals in the academic and research field, intervenors, teachers, clinicians and others at the service delivery level, and parents, families, and handicapped children.

Part II

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Part II

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Part III

INTRODUCTION

The program of research carried out in Project REACH was based on the premise that sound interventions for handicapped infants and young children derive from understanding of the nature of the interaction between child characteristics and setting influences. Our research efforts were directed, therefore, at the study of (a) child characteristics across the age range infancy through preschool, taking into account the nature and severity of handicapping conditions, and (b) characteristics of the environments in which handicapped young children live. Our research was focused on 4 major priorities identified in RFP #77-18:

1. Description of Child Characteristics
2. Description of the Handicapped Child's Larger Environment
3. Documentation of Educational Interventions
4. Documentation of Child Progress

The REACH research plan involved both longitudinal and cross-sectional strategies, the longitudinal strategy allowing study of children and families over time, the cross-sectional work allowing investigation of specific questions and effects. The program of research as a whole was integrated into the ongoing research and training programs on the UCLA campus, particularly within the Graduate School of Education. UCLA faculty were primary research investigators directing the various research programs, and UCLA undergraduate and graduate students were involved as research assistants on all projects. The rich professional resources of the campus, thus, were brought to bear on the problems of young handicapped children.

This report is organized according to SEP guidelines (April, 1982). Part IV contains a rationale for the research conducted in REACH, including a statement of the Mission, Objectives, and Activities of the Institute, a brief discussion of the conceptual framework which directed our work, and some background assumptions which served as guidelines for our operational decisions. Part V describes the administrative organization of the project. Part VI consists of synthesizing summaries of the various programs of research carried out during the five years of the Institute. Studies are grouped according to infant/toddler or pre-school focus, and according to content as defined in the research taxonomy. Part VII contains a detailed product list categorized according to investigator. Parts VIII and IX summarize dissemination and training activities, and Part X lists personnel involved with the Project over the period 1977-1982. A discussion of the impact of Institute activities is found in Part XI. A final section (XII) is an appendix containing publications and products.

Part IV

INSTITUTE MISSION, OBJECTIVES, ACTIVITIES

The single overriding goal of Project REACH was to provide evidence which could lead to more powerful interventions for handicapped children. In specific, we set out to identify child characteristics and social setting variables which contribute to handicapped children's success within an educational setting. To accomplish this it was necessary: (a) to study characteristics and abilities of handicapped infants and children; (b) to assess and understand family and community resources available to them; and, (c) to determine the nature of the educational programs or interventions that serve them.

The construct that served as a goal-directing, organizing, and unifying theme for Project REACH was that of personal competence. In our work, personal competence referred to a capacity to generate effective interactions with the environment, interactions that lead to adequate and satisfying participation in society. Research with young non-handicapped children provides evidence that competencies embody complex processes that are developmental, transformational, and multivariate in nature. Even in the early years of life competence includes general abilities related to use of symbols, affiliative responses to peers, impulse control, attentiveness, persistence, internalization of social norms, and the like. These are desirable capabilities for handicapped and non-handicapped alike, as they contribute to the development of children's personal adequacy within the social-educational context.

While the broad construct of personal competence was Project REACH's primary conceptual underpinning, the complexity of the construct required delineation in order that specific research questions could be addressed empirically. We arbitrarily defined personal competence in young children as consisting of four interrelated, overlapping domains--cognitive, social, affective, and physical. These domains became the targets for specific research projects. In the cognitive domain we included abilities that are related to attention, memory, use of language, and development of effective ways of selecting information and of responding to events and objects, (i.e., information-processing abilities). While these cognitive processing abilities are requisites for social competence, social abilities also include interactions with caregivers and peers, the learning of social rules, affiliative responses, and utilization of other people when appropriate. The third domain, which we labelled affective, subsumed temperamental as well as motivational characteristics. It included ability to be active and constructive in one's environment, to persist, to be self-regulating, to control impulses, and to be enthusiastic about situations and events. Finally, physical competence involves learning to care for one's self, to use fine and gross motor skills effectively, and to manage physically based tasks. Our focus was on the cognitive, social, and affective components of competence as, in our view, accomplishments in these domains are most sensitive to environmental influences and to intervention efforts. Where appropriate we considered the effects of motoric restrictions and handicaps on development in these domains.

In order to integrate our research efforts we developed a taxonomy which delineated and organized the various research components. The taxonomy is represented graphically in Figure 1. It incorporates both sub-

CLASSIFICATION VARIABLES	INTRINSIC VARIABLES ABILITIES/CHARACTERISTICS	EXTRINSIC VARIABLES		GOALS
		Resources Informal	Formal	
Chronological Age	Temperament	Attitudes/ Expectations Parents/ Teachers	Interventions	
Sex	Cognitive: Attention Strategies Memory Communication: Verbal/Nonverbal	Socialization Forces		Personal Competence: Affective Cognitive Social
SES	Social-Emotional Interactions Parent/Peer	Support Systems		
Diagnosis	Self-recognition/ Regulation			

Figure 1. Project REACH: Taxonomy of Research Variables.

stantive and methodological considerations and, in addition to providing a working organizational system, it integrated our goals at the conceptual level.

Taxonomy components identified major areas of child characteristics which we considered as interactive, yet unique enough to warrant study. These categories of abilities included (a) temperament; (b) cognitive processes of language and communication, attention, and problem-solving strategies; and (c) social, affective, and emotional characteristics.

A converging research track, addressed in conjunction with the studies of child characteristics, had to do with environmental resources. Our formulation suggested that support services, broadly defined as socializing influences, were formal or informal. Formal resources included societally defined institutions: governmental agencies, social service departments, schools, and the like. However, formal interventions represent only one kind of resource which influences the educational and social development of handicapped and at-risk children. Indeed, it might be argued that the informal influences inherent in the affective and social milieu which surround the child may be more powerful than the recognized formal, institutional ones. Therefore, we also studied informal influences which interact with children's characteristics to facilitate or impede the growth of personal competence. These informal influences included social and cultural socialization modes, attitudes and expectations, and the personal-social interactions which occur both outside and within the formal service delivery systems.

Taken as a whole, the taxonomy served as an heuristic which organized and provided operational direction to our research efforts. As presented in Figure 1, the taxonomy was not to be viewed as a model. It represented only one point in time, and did not specify the nature of the relationships or the directions of interactions among components. However, it was possible to hypothesize about the direction of effects and to begin to introduce developmental considerations through study of component parts over time. The developmental questions which were fundamental to the project (i.e., the outcome of child and environmental transactions) necessarily required converging information within a longitudinal paradigm. Therefore, as much as possible, the activities carried out within each taxonomic component were related within and across time periods of the project as a whole.

In sum, the objectives in Project REACH related to two major questions: What are the effects of particular handicapping or at-risk conditions on the development of personal competence? What interventions or experiences facilitate the growth of handicapped and at-risk children? Study of the components identified in the taxonomy provided data about child characteristics, the handicapped child's larger environment, and educational interventions which relate directly to these questions.

The scope of the project and the range of specific studies necessitated the use of different research strategies. Our operational plan called for coordinated use of both longitudinal and cross-sectional approaches. The longitudinal paradigm was primary in REACH reseach. Information gathered within this paradigm allowed generalizations about the effects of particular handicapping or risk conditions on children's development, and provided data from which we could identify different patterns of development which characterize particular risk or handicapping conditions. The longitudinal data also allowed examination of possible linkages between patterns of development and characteristics of the children's social and familial conditions.

The cross-sectional strategies provided detailed and in-depth information about specific conditions or influences, allowed tests of hypotheses about particular conditions and treatments, and generated appropriate and adequate measurement and instrumentation. The major markers used in the longitudinal study were developed and tested in the cross-sectional studies directed at specific taxonomy components.

Part V

ADMINISTRATIVE ORGANIZATION

The administrative organization of Project REACH is described in the following pages and tables. Table V-1 depicts the overall organization, Table V-2 the specific research responsibilities of faculty, and Table V-3 the staff positions within the administrative organization.

The co-principal investigators, Barbara K. Keogh and Claire B. Kopp, were responsible for the conceptualization, long range planning, and policy making of the project. In addition, Keogh has coordinated the preschool, intervention, and child progress studies. She has also integrated graduate student research training into specified REACH projects. Kopp has been responsible for the coordination of the infancy, toddler, and resource studies. In addition, Kopp has been responsible for the coordination of general day-to-day Project REACH management.

Project REACH was organized to capitalize on research strengths already represented by UCLA faculty and graduate students. The project has been integrated into the ongoing graduate training program so that students' professional preparation was enhanced through their involvement with REACH projects. In addition to the co-directors, faculty with major participation were Chan, Krupski, and Mahoney from the Special Education Program; Stipek from the Early Childhood program within the Graduate School of Education; and, Greenfield from the UCLA Department of Psychology. Specific faculty research responsibilities are outlined in Table V-2.

A number of post-doctoral scholars have been involved with Project REACH research. These included Humphrey, Monroe, Sheehan, Vaughn, Young, and Weisz. Their work was coordinated and supervised by the co-directors. In addition, many graduate students have served as Research Assistants in Project REACH studies; student financial support and time commitments were determined by University policies and guidelines. Level of assistance was determined by the student's status in the graduate program (i.e., pre- or post-advancement to doctoral candidacy). Selection and appointment of research assistants have followed affirmative action procedures as specified by the University and Graduate School of Education.

It is important to emphasize that all Research Assistants were full-time students in UCLA graduate programs; many were doctoral students in Special Education. The project was firmly committed to the policy of involving students in the full range of REACH activities; and as a whole, the project made major training contributions. A list of trainees and their current positions are found in Training - Section IX.

Specific staff positions within the administrative organization are listed in Table V-3. Three major staff positions are described along with key secretarial and clerical support. The Project Manager was responsible for all payroll and personnel matters, financial monitoring and reporting, the coordination of proposal and progress reports, day-to-day operations including the supervision of secretarial and clerical staff, and dissemination activities. A second key position was that of Longitudinal Coordinator. This position involved the coordination and administration of the longitudinal studies, including coordination and supervision of longitudinal staff. A third key position was that of statistician, which position provided technical assistance to the research staff in relation to the statistical aspects of the studies. Secretarial and clerical assistance were provided to the co-directors and to the research and support staff.

TABLE V-1

OVERALL ADMINISTRATIVE ORGANIZATION OF PROJECT REACH

Co-director (Keogh)	Keogh & Kopp	Co-director (Kopp)
	Conceptualization Long range planning Policies	

Preschool, intervention, child progress studies
- Faculty
- Postdoctoral scholars
  - Graduate students
	Longitudinal Studies
	- Coordinator
	  - Assistant coordinator
	  - Testers
	  - Research assistants
		Infancy/toddler studies
		- Associate Researchers
		  - Postdoctoral scholars
		    - Research assistants

Integrate gradute students' research training into specified REACH projects - Graduate student seminars		Coordinate day-to-day management - Project manager - secretarial and clerical assistants

TABLE V-2

ADMINISTRATIVE ORGANIZATION OF FACULTY RESEARCH RESPONSIBILITIES

PRESCHOOL	LARGER ENVIRONMENT	INFANCY/TODDLER
Keogh (co-director)	**Keogh and Kopp**	**Kopp** (co-director)
overall preschool temperament attribution documentation of child progress longitudinal (preschool)		overall infancy/toddler longitudinal (infancy/toddler)
Chan		**Mahoney**
social competence social intelligence		language development mother-child interaction
Krupski		
attention		
Stipek		
child attribution		
Greenfield		
language-cognitive interactions		

TABLE V-3

STAFF POSITIONS WITHIN THE ADMINISTRATIVE ORGANIZATION

Position	Responsibilities
Project Manager	Monitor budget/expenditures, prepare financial reports Manage payroll and personnel matters Coordinate proposal and progress reports Supervise secretarial and clerical staff Coordinate dissemination activities Administer day-to-day operations
Longitudinal Coordinator	Contribute to conceptualization, subsequent research and data analyses related to longitudinal samples. Supervise longitudinal staff and testers.
Statistician	Provide technical assistance in relation to technical aspects of studies.
Secretaries	Provide secretarial assistance to co-directors. Administrative and secretarial support to project manager, faculty and research staff.

Part VI

DESCRIPTION OF STUDY AREAS

A-1: Infant/Toddler Studies

Overview

The Project REACH infancy and toddler studies were channeled into three areas. One group focused primarily on elucidating child characteristics. To this end, intensive studies were conducted of normally developing, Down syndrome, and Developmentally Delayed children (uncertain etiology) on sustained attention and self-control tasks. Developmental test data and maternal report items were also collected. The data from the studies represent a unique set of findings, obtained from hundreds of observations, about competencies that begin to emerge in the second and third years of life, and that have ramifications for success in social and educational settings. Investigators involved in the research included Claire B. Kopp, Joanne Krakow, and Brian Vaughn, with major assistance provided by Kim Johnson, Anne Weickgenant, Jeanne Doyle, Diane Parham, Nancy Baker, and Marvin Lee.

Another group of studies focused upon child and mother. The first set of analyses is an extension of the research described above in that some of the laboratory situations have been used to code mother behaviors. The findings reported are preliminary since analyses have just been initiated. Coding procedures, reliability, and data analyses were primarily done by Kim Johnson, Diane Parham and Anne Weickgenant with guidance from Kopp.

In another research project, a small number of 5- to 7-month old normally developing and Down syndrome infants was observed in a short-term longitudinal study by Susan Markowitz. Developing a rich theoretical framework which incorporated attachment theory, developmental principles, and themes of individuality, Markowitz examined infant and maternal repertoires over a three-month period. Developmental changes in behaviors such as en face, hand play, etc. were examined, as were group differences, and unique interactional patterns of dyads. This research was conducted as part of Markowitz's dissertation which was chaired by Kopp.

A third group of studies was conducted by Gerald Mahoney and his colleagues. This research focused on developmentally delayed toddlers (many of whom were Down syndrome) and their mothers. A primary focus of the studies was devoted to communication parameters and the quality of interactions. Three studies focused upon psychological and social characteristics, and one study was directed toward intervention.

Rounding out this section on the infant/toddler are two research projects that were initiated as a response to practitioner requests. The first involved a comprehensive analysis of infant tests undertaken primarily by Kim Johnson with the guidance of Kopp. The second was a study of intervenors' belief systems. The research was conducted by Elizabeth Munroe with guidance provided by Kopp.

Numerous publications and presentations have resulted from the research described in the final report. Some primary references are given at the end of each report; however, a complete list of presentations, articles that have been published or are in preparation or in press is found in Section VI, B.

Child Characteristics

(Kopp, Krakow, & Vaughn)

Many of the Project REACH infancy and toddler studies have centered on describing cognitive and social characteristics of normally developing and handicapped children during the second and third years of life. The emphasis was dictated by the fact that this age period is a time of major intellectual and social growth, yet one that is vastly under-researched. As a result, major challenges confront those attempting to understand and interpret the functioning of handicapped and at-risk children, or to address issues related to the origins of problematic performance.

Several conceptual and methodological considerations guided our research. First, the approach has been explicitly developmental, acknowledging that some changes are incremental and others are marked by the emergence of new forms of behavior. The acceptance of this premise has influenced the content and methods of what we have studied, and the emphasis ascribed to individual differences. Second, the studies reflected a blending of techniques, in that traditional developmental assessment measures were complemented and extended with a variety of observational tools.

In general, the background and rationale for the research stemmed from conceptual frameworks developed in relation to non-handicapped children (Block & Block, 1973, 1978; Bronson, 1971; Murphy & Moriarity, 1976; Matas, Arend & Sroufe, 1978; Sroufe & Waters, 1977; Wenar, 1976; White & Watts, 1973). The focus of these studies has been the delineation and definition of competence during early childhood. Competent behaviors examined included problem solving, appropriate use of adult resources, beginning regulation of one's own behavior, planning and utilization of strategies for play and social interactions, learning to use socially mediated rules, and being attentive to one's milieu.

Handicapped children have problems in these areas (Chess, 1974; Kessler, 1970; Rutter, Tizard & Whitmore, 1970). Generally, difficulties have been noted in relation to inattention to selected tasks, distractability, impulse control, inappropriate role behavior directed toward parents and peers, and poorly modulated behavior in social settings. Although some of these problems emerge before early childhood, the question of how they arise and how they are manifested has been largely neglected. Thus, the major goals of the Project REACH infancy/toddler studies have been to describe and examine two critical components of child development, sustained attention and self-control. Both are necessary for success in social and school settings.

By sustained attention we mean the child's ability to become involved and to remain involved in play and educational activities. By self-control, we refer to young children's ability to modify their behavior according to family, social, and educational expectations. Self-control behaviors include complying with requests, adhering to family practices, waiting as necessary, inhibition of verbalizations and/or locomotion as appropriate, and awareness of and production of appropriate behaviors even when external monitors are not present.

Several broad research questions guided the studies. What is the developmental course of sustained attention among normally developing children? How do various aspects of self-control, especially the ability to delay and to comply with caregivers requests, develop? How do individual differences in these abilities relate to other emerging aspects of development? What similarities and differences in sustained attention and self-control characterize the development of young handicapped children? What are the meaning and implications of group differences? How do maternal behaviors vary as a function of child developmental level and child characteristics?

Overall Approach

During the three years from 1979 to 1981, several hundred children were observed and videotaped in the Project REACH Infancy/ Toddler Laboratory. These included normally developing children at ages 12, 18, 24 and 30 months and handicapped children from two diagnostic groups: Down syndrome and developmentally delayed, all of unknown or uncertain etiolgy. A developmental examination was administered to all children in order to obtain a measure of the child's developmental age. This enabled us to make comparisons between normally developing and handicapped young children who had equivalent skills, but who differed by a year or two on chronological age.

A considerable amount of information was collected about each child, his/her parents, and their living situations. Child information included chronological and developmental ages, sex, type of birth, health history, presence of corrected and uncorrected visual problems, intervention history, if appropriate, and so forth. Parent information included education and occupation, parent report about child functioning, siblings in the home, and so forth. In general, the information was used to make each sample of children as homogeneous as possible in order to facilitate interpretability of findings (Kopp & Krakow, in press).

Sustained Attention

Background. Sustained attention during the second year refers to the toddler's spontaneous focus upon and continued engagement in play activities. It involves manipulation, exploration and play with toys and other objects, and may also include drawing others into play activity, as appropriate. The critical property of sustained attention is that the child is focused fully on the activity.

Since the developmental literature provides few details about the course of visual-manipulative sustained attention, we have speculated about a sequence, drawing upon numerous writings (Krakow & Kopp, 1982). At first, attention is solely a visual act which is a primary mode of adaptive development and occurs from birth onward (Piaget, 1952). The importance of attention for exploration was emphasized by Gibson and Rader (1979) who pointed out that at three to four months of age, infants' perceptual exploration and curiosity are as strong as they ever will be, and that subsequent development will focus on other aspects of attentiveness. It is evident, then, that visual attention is available as a processing mechanism early in life. However, during subsequent months attention expands and changes in focus and control.

Studies of visual attention during the first six months indicate a highly predictable course of selectivity (Banks, 1981; Cohen & Salapatek, 1975; Fantz, Fagan & Miranda, 1975) which refers to the organism's ability to attend differentially to different aspects of the environment. For example, during the early weeks of life, infants look longer to curved rather than straight edges, to contrast rather than to plain surfaces, to larger rather than smaller stimuli, and to few rather than many elements. At about three months of age, a shift occurs and infants prefer novel stimuli over familiar ones. Subsequently, they become proficient in discriminating and seeking out additional aspects of their environment.

After this period, preoccupation with hands commands the focus of visual attention, and infants initially devote many of their waking hours to looking at their hands. Later, they begin to reach and grasp. Prehension at first demands almost all of the infant's attention, but with practice, attention is freed from the actual performance of reaching and grasping. Shortly after, at six and seven months of age, infants' visual attention shifts to objects, and they engage in visual-manipulative exploratory behavior with a variety of three-dimensional objects. The second half of the first year is marked by refinement and consolidation of visual prehensile skills. Infants not only secure objects without intensive effort, but also actively choose among objects within reach.

In sum, the focus of attention shifts from hand *per se*, to what the hands can do with objects, then to the objects themselves. At this point, infants study objects for their particular characteristics, and in so doing begin to think of themselves as separate and distinct from the object that is held and manipulated. The child also becomes aware of, or conscious of acts and objects.

These phenomena signal the real emergence of sustained attention - the ability to remain engaged in a play or task situation (Douglas, 1979; Kopp & Vaughn, 1982; Kopp, Krakow & Vaughn, in press; Krakow, Kopp & Vaughn, Note 1). That is, the child actively analyzes and contemplates acts and objects together and continue to engage in play that is interesting and/or pleasurable. Sustained attention becomes increasingly important during the latter part of the first year. In sum, we suggest that sustained attention comes out of a sequence of the child's experiences with objects.

Our interest has been to document changes in sustained attention during the second and third years of life and to seek evidence of group and individual differences. Our goal was to study a) how long engagement was maintained and b) the general characteristics that sustained attention showed.

Methods. Several play and simple problem solving activities were presented to the child. In one, the child was seated with a bucket of toys and told to sit and play while the parent sat nearby but uninvolved. Included in the bucket were a doll, a bottle, some finger puppets, a truck, a book, and other age appropriate toys. Of interest was the amount of time (during six minutes) that the child remained engaged with the toys, and the amount of time during which he/she strayed away (e.g., wandering, or investigating the camera, etc.). Also coded were other aspects of children's play with toys, including whether they engaged in functional play, (e.g., feeding the doll with the bottle), whether they used toys to initiate interaction with adults in the room, and whether children sat still with the toys or walked around with them. Table VI-1 shows the coding system used with younger aged children.

Age trends and individual differences. Between the ages of 12 and 30 months, children's ability to become involved and to stay involved in play expanded dramatically (Krakow, Kopp, & Vaughn, in preparation). At 12 months, virtually all children wandered away or became distracted by other objects or people at some point during the six minutes. Play, when it occurred, often was directed first to one toy, then to another, and yet another; rarely were toys combined. By 30 months, virtually all children played with and explored the toys in the bucket independently and attentively for six minutes.

In order to determine the long-term ordinal consistency of sustained attention, cross-time intercorrelations were computed for time on task. The resulting intercorrelation matrix indicated that time on task at 12 months was significantly related to time on task at each subsequent age period. At each age, though, time on task was unrelated to developmental quotient.

The findings demonstrate the reliability and stability of sustained attention to play materials during the second year of life. Taken together, the results indicate that individual differences in laboratory-assessed sustained attention appear by the first birthday and remain consistent throughout the subsequent period of consolidation and growth. In addition, the dimension of individual variability appears to have important predictive and concurrent developmental correlates.

Like selective attention during the first year, our measure of sustained attention during the second year shows a predictable developmental progression. The young infant comes to attend to increasingly complex, novel and moderately discrepant stimuli, and becomes increasingly adept at scanning stimulus features. The older infant becomes increasingly inclined to engage fully in the activity at hand, and to disregard extraneous, non-focal features of the environment. We believe that this latter progression, like the one documented during the first year, reflects an increased efficiency in information processing abilities that is tied to more general cognitive development. In effect, the older infants' gains reflect increased specificity, flexibility and economy of cognition.

Unlike selective attention during the first year, however, individual differences in second year sustained attention appear to be remarkably robust. This finding is consistent with other research which suggests that, by the end of the first year, laboratory play behavior reflects meaningful individual differences in domains such as exploration, mastery motivation and style/tempo of play. Because these approaches, and ours, share measures of sustained attention/continuity of engagement, it is likely that they all tap related components of infant variability. Should this prove to be the case, we may be able to move toward a broader understanding of the development

Table VI-1

Sustained Attention Codes

A. Engagement (sums to 360 seconds)

  1. Sustained attention (engaged by occupied with toys)
  2. Unengaged with toys but occupied with an object (e.g., camera, own shoe)
  3. Unengaged with toys, but socially occupied (e.g., crawls on mother)
  4. Unengaged and unoccupied
  5. Unengaged, unclassified (e.g., fingers shoe and regards mother with little affect)

B. Content of play (coded only during Sustained Attention [e.g., Engagement = 1])

  1. Holds, regards, looks over
  2. Throws only (e.g., throws one toy after another)
  3. Stereotypic only (e.g., loads and unloads bucket with no attention to items)
  4. Manipulates (e.g., dangles, moves)
  5. Functional play (e.g., feeds doll)

C. Number of Glances (from non-focal toy) (duration of glance $\leq$ 3 seconds, and must be followed by return to prior activity, coded only during Sustained Attention [e.g., Engagement = 1])

  1. Toward mother or examiner
  2. Toward non-focal toys or room (e.g., camera)

D. Object/social orientation (sums to 360 seconds)

  1. Orientation is totally or primarily object-directed (may glance at mother)
  2. Orientation is divided between objects and mother (e.g., offers toy), or is primarily or totally social
  3. N.A. (e.g., neither objects nor mother are attended to)

E. Postural

  1. Sits only
  2. Walks, crawls, lies, etc.
  3. Neither of above (e.g., moves from sit to stand)

of early cognitively-mediated differences in attention, motivation, and other domains.

Group differences. Comparisons of duration scores revealed that young Down syndrome children showed similar amounts of sustained attention to the normally developing subjects of equivalent developmental age (Krakow & Kopp, in press). This was true across the developmental age range studied, 12 to 36 months. By contrast, developmentally delayed infants in the 12 to 24 month DA range showed significantly less sustained attention than other infants studied. By 24- to 36-months DA, however, the three groups had equivalent durations of attention to toys.

There were, in addition, several intriguing qualitative diagnostic group differences. For example, when normally developing children were not engaged in play with toys, they were almost always involved in some other meaningful exploration or social activity (e.g., contacting their mother or examining the video-camera). Handicapped children, on the other hand, tended to show another pattern of behavior, and one rarely seen among normally developing children. At times, they were unoccupied or preoccupied, staring into space or at the ceiling, or wandering aimlessly about the laboratory space. Also, in general, the handicapped children turned to their mothers less often than did normally developing ones, neither glancing briefly nor initiating socially.

Normally developing children glanced up from their play approximately once every twenty seconds, half the time to look at mother or examiner, and half the time to look at a non-focal toy, the camera, or some other part of the room. Children from both diagnostic groups glanced up less often, particularly to non-social aspects of the environment.

Our data also showed that handicapped young children in both groups acted more repetitively with toys than did normally developing children. The handicapped child often performed the same action or series of actions again and again during the six minute play period. Repetitive behavior may mean that handicapped children do not have as many opportunities to learn about their world because a repeated performance becomes an end in itself. Finally, analysis of the children's behavior when the sustained attention task was concluded and a new unstructured play task was presented revealed a greater proportion of problem behaviors for the handicapped group. These included regressive and repetitive behaviors, slowness in shifting from one to the other situation, and throwing of objects.

Implications. All of the findings noted above have potential implications. Taken together, these studies offer a multi-faceted picture of developmentally delayed young children. On one hand, when they are equated for overall developmental level with normally developing children, there are marked similarities in attention to and engagement in play activities, including the level, content and structure of play. This finding is consistent with the "developmental" interpretation of delay.

On the other hand, the findings reveal that similarity in sensorimotor, in cognitive and language domains and in play behavior does not necessarily imply similarity in all aspects of functioning. Non-redundant, spontaneous, flexible play appears to characterize development that is proceeding on course not only in terms of order and sequence, but also in terms of timetable. Findings of measurable differences between the ND and delayed samples may point to a "wrinkle" in the system. What remains to be determined is whether the wrinkle, in this case a differential pattern of attention allocation, has rippling effects. It is conceivable, for example, that the lack of spontaneity and flexibility documented here may interfere directly and/or indirectly with subsequent learning and development for delayed young children, and set in motion a spiraling effect in which subtle behavioral differences lead to more exaggerated differences. This suggestion is consistent with recent studies of older mentally retarded children.

Finally, failure to turn to mother means the children may not take advantage of a valuable source for information and help. Inability to utilize fully the supports that are available undoubtedly has spiraling effects. Not only does the delayed infant fail to enlist aid, but also an interactive pattern whereby caregivers respond to and sense infant needs may be jeopardized.

Although these findings need to be replicated, we believe that they are robust enought to warrant attention by practitioners. It would be useful to document how handicapped children structure their play activities, and what interventions can be directed toward remediation of consistent regressive, stereotyped, or unoccupied behaviors.

Self-Control

Background. The research described below was designed to broaden our understanding of young children's ability to monitor their own behavior. The significance of this achievement for child, family and society is indisputable. In a matter of months the infant changes from one who is virtually unaware of caregiver expectations and social requisites to one who, to some extent, has a sense of identity, adheres to family practices, recognizes the appropriateness of behaviors for specific situations, and acts upon family and social demands in the absence of external monitors. The socialization of young children requires the transmission of adult values, expectations and norms, and although these influences begin soon after birth, the most direct and socializing acts occur when infants start to understand the language of their culture and to ambulate freely. The walking year-old toddler serves as a cue that new caregiving strategies must be adopted to help the child understand that expectations exist about behavior toward objects, people and situations. At first child responsiveness is limited to a few acts of simple compliance, but in a few weeks the nascent ability to monitor his or her own behavior arises, setting the stage for future growth.

Why and how this transformation occurs has been a source of interest to philosophers and psychologists of diverse persuasions. In a recent article, Kopp (1982) suggested that the young child's ability to monitor his/her own behavior is initially linked to increasing cognitive skills (e.g., representation and recall) but is also significantly influenced by biological factors, and caregivers. To support this thesis, an extensive amount of theory and empiric research was drawn upon. Further, in the article, developmental transitions in monitoring behaviors were described in terms of phases (e.g., labeled control, self-control, self-regulation). Each label was hypothesized to stand for a) the level of cognitive development the child reached, b) the degree of child self-understanding, c) the kind of self-monitoring the child could exercise.

Since the amount of empiric data on the topic of self-monitoring was quite sparse, our first research focused on two and three year old children hypothesized to be in the phase labeled self-control. Broad research questions that were asked include: What is the developmental course of self-control? How do aspects of self-control, specifically the ability to comply and the ability to delay, develop? How do individual differences in these abilities relate to other emerging aspects of development? What similarities and differences in self-control characterize development in young handicapped children when compared to normally developing children? In what ways do the behaviors of mothers vary as a function of child developmental level and child characteristics.

Methods. In our laboratory, self-control was operationalized in two ways, both taking into account the relatively limited ability of most children of this age. One was a measure of compliance to a maternal request, and the other a measure of delay (the child was requested not to touch an object until given permission). Both of these tasks are analogous to everyday experiences of young children, but do not reflect the sum total of the child's self-control repertoire. All procedures were videotaped.

The compliance tasks involved two interactions of child and mother. In one, the child after playing uninterrupted for a set time was instructed by his/her mother to clean-up and put away the toys. The other task involved an unsolvable game for the child in which the mother was requested to assist the child as she desired. Detailed codes, which had been piloted extensively, were used to record what child and mother did, how they played with each other and the toys, the affect each displayed, and duration scores, e.g., time to compliance.

The delay tasks involved two timed situations in which the child was asked to avoid touching highly desirable objects. In the first, E presented the child (and then left him or her alone) with a brightly colored unusual object while mother sat nearby ostensibly occupied. In the second, the child played a game with E (while mother sat looking on) which involved waiting for a food reward. Codes were used to note time elapsed before the child touched the objects and the first task the types of behaviors the child emitted while he or she did not touch the object.

In Vaughn, Kopp and Krakow (in preparation), we described developmental changes and individual differences in self-control among normally developing children. Twenty children (10 female) were seen at each of three ages, 18, 24, and 30 months in the laboratory and received the complement of delay and compliance tasks. Stability across task, time and situation was found to be adequate for the delay tasks. Analyses revealed that normative trends for delay was significantly related to age. Eighteen month olds, however, did not show skills necessary for delay, regardless of their developmental ages. Even 24 month olds showed only modest consistency across task whereas by 30 months, correspondence across task and situation were high. Individual differences within each age were not significantly related to developmental age, to developmental quotient, nor to gender. Language precocity at 24 months of age, however, was modestly related to delay tasks.

Unlike the delay measures, the behavioral categories coded during the cleanup procedure were not initially conceived as indices of a single characteristic. To evaluate the consistency of these variables, we calculated the cross-episode autocorrelations for all frequency variables with satisfactory rater agreement. Given consistency of variables across episodes of the clean-up procedure, each variable was summed to yield a total score.

So as to more economically present the relationships among the variables a principal factor analysis was performed on the 8 variables having significant correlates within the data matrix. This analysis yielded three orthogonal factors: Non-compliance/argue, Compliance, and Non-compliance/avoid.

Age trends. The scores for the factors and the overall compliance score were subjected to separate one-way analyses of variance. Analyses indicated that only the two extreme groups (18- and 30-months) were significantly different from each other. Thus, older children tended to show compliant behavior in response to the mother's directives more often than did the younger children.

Though younger children were not as compliant as older children, the data indicated that scores for Non-compliance/argue increased with age even though the overall *F* value did not reach the conventional level of significance. Further, scores for Non-compliance/avoid were relatively higher for the 24-month old children than for either of the other groups. These data indicate that the youngest children were both less compliant with mother's directives and less non-compliant in the face of these directives than were the children in the two older groups.

As with the delay measures, we were interested in the relationships between the compliance variables and developmental difference variables. When age was partialled out, only Non-compliance/argue retained any of its developmental correlates. Developmentally older children were more likely to receive positive scores on this factor than younger children.

Finally, examining the relationship between delay and compliance, we found at 18-months the correlations between delay and compliance were small and signed negatively, at 24-months the values were near zero, and at 30-months, the correlation values were positive. These data suggest that the two components of self-control do not begin to become coordinated until about 30-months of age.

In sum, the data suggest that the capacity to delay and modify behavior is positively associated with increases in chronological and developmental age. Further, the data imply that several aspects of development (e.g., cognitive, language, socialization) contribute to the observed increases in self-control. Finally, our data suggest that the coherence of behavior across the tasks in our self-control battery is a function of increasing age.

Our data on the coherence of individual differences suggest that stable individual differences in self-control are unlikely to be seen until between two and three years of age. As noted above, it was not until 30-months that the delay tasks were substantially intercorrelated; and, it was not until this age that a positive correlation of any magnitude was seen with the Compliance factor from the cleanup procedure. Even at the oldest age studied here, the consistency from the delay to the compliance tasks was modest at best.

We have argued here that the achievement of self-control over behavior is an important developmental milestone. Elsewhere (Kopp, Krakow, & Vaughn, in press) we have suggested that self-control may be considered as an organizational construct, around which many other developmental milestones are coordinated during the second and third years of life. In other reports we have noted that the delay aspect of self-control is related to cognitive functions such as sustained attention (Krakow, Kopp, & Vaughn, in preparation) and to performance in a simple memory for location task (Lee, Vaughn, & Kopp, in press). The data presented in this paper provide a further empirical basis for consideration of self-control both as a developmental function and as an individual differences construct.

In a second study (Kopp, Krakow, & Vaughn, in press) questions were posed about the development of self-control among handicapped two and three year old children when compared with normally developing samples. The questions asked included: a) Is the development of self-control similar for handicapped children (with known cognitive delays) and normally developing children of equivalent developmental ages? b) Is self-control similar for children who have different etiologies for their handicaps? c) What additional child characteristics mediate performance? Three cross-sectional samples were constituted, normally developing, Down syndrome, and developmentally delayed children with unknown etiology (n = 17 each). Mean developmental age for each group was 29 months with a range from 22 to 34 months. Mean developmental quotients were 115, 64, and 70 for the normally developing, Down syndrome, and DD group respectively.

Results indicated that handicapped children regardless of diagnosis showed similar performance to normally developing children on the battery of self-control tasks. To some degree, all of the children inhibited a response when asked to delay and produced a sequence of active compliance behaviors. However, both handicapped groups showed appreciably poorer performance than normally developing children on the delay tasks, particularly the one in which E was absent and mother was engaged.

The most striking group difference finding emerged in analyses of age related changes. As described above, with normally developing children, developmental age and self-control ability showed high relationships. In contrast, very modest, non-significant coefficients were obtained with both of the handicapped samples. Finally, with respect to correlates of control, self-control and language age were unrelated for the handicapped children, however, non-task verbalizations and poor compliance were positively associated in the DD group.

We speculate that the early and intensive teaching and intervention efforts directed to handicapped children may contribute in part to the lack of age relationships. The young, cognitively immature child may respond to directives in a relatively rote fashion, not fully understanding the meaning of what he/she is doing, but appreciating that a directive means "behave." Thus, the external environment of the young handicapped child may give the child's behavior the appearance of self-control, without the substance of interwoven cognitive abilities to maintain it effectively. But why self-control behaviors "break down" as developmental ages increase is not understood as yet.

Finally, in another study, Kopp, Krakow, Vaughn and Johnson (in preparation) examined whether failure in one of the delay tasks was due to inability to produce behaviors that function as rudimentary strategies in the service of motor inhibition. In order to test this thesis, all visual, vocal and motor acts exhibited by the children during the delay task were recoded and grouped ito exhaustive categories.

Findings revealed that among normally developing children, latency to touch (e.g., delay ability) increased in a linear fashion from 18 to 30 months. Concomittantly increases in verbal, non-verbal, social, object-directed and object-avoided behaviors were found. Although no age changes in the overall tempo of actions per minute emerged, there was a marked decrease in the rate of stimulus object-directed behaviors per minute. At 18 months, more than half of the non-verbal activity was oriented toward the prohibited object, but by 24 months, only one third was. At 24 months, 2 out of 5 utterances were about the object; by 30 months, only 1 out of 5 was. Correlational analyses confirmed that increasing ability to delay was related to turning one's attention away from the tempting stimulus. Analysis of the handicapped children, taking into account the proportionately less time they evidenced delay, indicated that they produce fewer delay strategies, and those that were produced were less complex than those demonstrated by 24 and 30 month old normally developing children. We suggest that the inability to produce and call upon cognitive strategies may be one reason why children have difficulty coping with challenging social and educational situations.

In sum, the findings obtained with normally developing 2 and 3 year old children revealed a developmental progression for sustained attention and self-control. However, time of emergence for these competencies varied somewhat with relatively effective sustained attention evidenced by 12 months, but only rudimentary forms of self-control shown by 18-month-olds. Individual differences in these abilities were generally not related to developmental quotients.

These data have implications for understanding other aspects of child behavior. For example, the ability to sustain attention may provide an important means for young children to extract object and social information from their milieu. Jack and Jeanne Block (1978) recently suggested that the young child does not grow up in a world that is comprised solely of objects and predictable events, rather his/her milieu is an interpersonal environment characterized by erratic and uncertain feedback. The fact that handicapped children have difficulty in utilizing their attention efficiently may be one reason that interactions in their social milieu are often problematic. These children may not have paid sufficient attention to social demands.

Another implication relates to training procedures. There is, in this country, a goal to accelerate children's development, whether the child is normally developing or handicapped. Our data suggest that it is unlikely that "training" 18 month olds to control their own behavior can result in much success. A particular level of cognitive abilities has to be achieved before success and stability in self-control can be realized. The net result of these data is the importance of significant amounts of caregiver input to the child, at least until children begin to understand the meaning of caregiver expectations.

Mother-Child Interactions

(Johnson, Parham, Weickgenant, Kopp, & Mahoney)

Mother-Toddler Interactions (Johnson, Parham, Weickgenant, & Kopp)

The study of parent-infant interactions and their immediate and long-term consequences has a rich, albeit relatively brief, history. Much of the literature has been directed toward the young infant although a few investigators, including Bretherton and Bates (1979), Schaffer (1979), Wenar (1976), and White and Watts (1973), have focused upon the form and substance of interactions between toddlers and their parents. One of the questions of interest has involved examining how mothers channel and direct the interest of children who are motorically proficient but limited in language and comprehension. Findings have revealed that in interactions, mothers engage in a substantial amount of attention directing and structuring of activities using a variety of strategies.

We drew upon this literature in formulating procedures and codes (Parham, Weickgenant, & Kopp, in preparation; Johnson & Kopp, in preparation); however, the issue that interested us, particularly with normally developing toddlers and their mothers, was explicitly developmental. How did mothers change their behavior in a given situation as the child became more proficient? What specific dimensions of behavior changed, and what responses remained invariant? Observations have been made of 18-, 24- and 30-month old middle-class children and their mothers in a toy clean-up session and in a problem solving task. Conceptual clusters of maternal behaviors were formed and included: control style, external control, allowance for independent problem solving, and qualitative aspects of behavior (e.g., sensitivity). Preliminary analyses revealed a significant age effect for control style. Mothers of older children engaged in more power-assertive techniques and defined the clean-up task more precisely than did mothers of younger children. Maternal style (e.g., sensitivity) did not seem to vary with age. Data analysis continues (Johnson & Kopp, in preparation).

The issue of how mothers of at-risk or handicapped children and their parents interact has also been a topic of concern. Findings have not been conclusive, with some investigators reporting maternal "over"-control of child behavior, and others not (for a brief review of the preterm and Down syndrome studies, see Kopp, in press). A few investigators, for example Jones (1981), have shown that maternal interactional acts can be linked to a child response that "ignores" the interaction (e.g., non-referential looking).

Mindful of this literature, we have attempted to explore the interactions of handicapped toddlers and their mothers. The major questions posed were: a) how similar were mothers of normally developing children to mothers of Down syndrome and Developmentally Delayed children; and b) if differences emerged, where were they most salient? To date, preliminary analyses of behaviors of mothers of the three groups of children (who are primarily at a developmental age of 24 to 30 months) reveal the following (Parham, Weickgenant, & Kopp, in preparation). Mothers all appear to have been equally invested in helping their children achieve success in a compliance task. In general, all mothers produced a variety of strategies including incentives, modeling, and asking favors. The most common behaviors were organizing and directing the child to task, and pointing and patting objects to be put away. In contrast, mothers did not threaten their children, nor did they withdraw from the task to let their children do as they pleased.

Interesting group differences emerged with mothers of normally developing children showing the smallest number of touches and other bids for child attention, and mothers of Down syndrome the most. These mothers also provided the most overall direction to their children, but the scores of the mothers of the other delayed sample were only slightly less. Mothers of normally developing children often made the task into a game and shared the activity with their children, whereas these behaviors were seen far less frequently in the interactions of the mothers of the handicapped children.

These preliminary findings suggest that mothers generate an agenda of expectations for their children that is based on child performance. That is, as children begin to show increasing maturity, there is a concomitant increase in maternal specificity of requests and more demands for appropriate behavior.

With respect to behavior of mothers of handicapped children, it was evident that these mothers were more similar than different to mothers of normally developing children. Interesting, albeit intuitively sensible and intrepretable, differences emerged around the level of structuring the child's environment. Here mothers of handicapped children showed relatively high levels of direction. Clearly, this meshed with child behavior (e.g., poor attention deployment, difficulty in delay, etc.). Whether this adaptive strategy was self-generated or the result of intervention training is not known. In any event, the mothers' actions seemed to be fine-tuned to child ability.

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Mother-Child Interaction of Normally Developing and Down Syndrome Infants (Markowitz & Kopp)

The purpose of this study was to investigate variation in the development of infant interactional behaviors and reciprocal maternal responses among dyads with Down syndrome and normal infants. By emphasizing analyses of idiographic patterns, this study was designed to contribute to our understanding of individuality in mother-infant relationships. The issues addressed were derived from a conceptual argument which integrates individual and developmental variability into the attachment framework.

Three Down syndrome infants and three normally developing infants and their mothers were videotaped during a face-to-face interactional situation once a month when the infants were five, six and seven months old. A maternal questionnaire was used to acquire information about the onset of infant signalling behaviors. The Gesell Developmental Schedules were used at each observational session to obtain a measure of the infant's current developmental level.

The videotapes were coded at one second intervals for infant and maternal interactive behaviors, and combinations of behaviors which naturally co-occur. Tables VI-2 and VI-3 provide a description of codes. A hierarchical system was imposed upon the codes to provide for organization of analyses of infant and maternal behavioral repertoires (Tables VI-4 and VI-5). Infant signals were analyzed for single behaviors, gaze-alone behaviors and acts, and direction of gaze during an act. Maternal behaviors were analyzed for single behaviors, play and non-play behaviors, and combinations of play and vocalization behaviors.

The behaviors were examined for: 1) general patterns of infant and maternal repertoires, 2) developmental changes, 3) individual differences, and 4) patterns representing individuality. The results indicated the overriding importance of *en face* behaviors in all infant repertoires and the specific salience of infant *en face*-vocalization for all mothers. All mothers initiated stimulating types of behavioral patterns in response to their "non-active" infants, whereas they demonstrated behaviors conducive to reciprocal dialogue when their infants showed substantial increases in *en face*-vocalization. Further, the findings suggested that at the lowest developmental ages, infants exhibited less *en face*-gaze and more orientation to mother's body. In turn, mothers exhibited contrasting response patterns to these two types of infant gaze behavior.

Finally, the results showed that production of a specific maternal behavior was linked to the direction of infant gaze. All mothers differentiated between infant patterns of *en face*-vocalization and off-gaze-fuss. All mothers produced non-vocal responses to infant *en face*-vocalization, and exhibited vocal responses to infant off-gaze-fuss. However, mothers differed from one

Table VI-2
Operational Defintions of Infant and Maternal Behaviors

Behaviors	Definitions
*EnFace (EF)	Infant's head and eyes directed at mother's face.
*Orientation to Mother's Body (OB)	Infant's head and eyes directed at mother's body or tracking her hands.
*Off-gaze (OG)	Infant lowered or averted eye gaze or head averted.
Smile (S)	Infant's mouth is open and widening. Deep grooves or foldings from the elongated mouth to nose. Eyes may be squinting.
Vocalize (V) (Nondistress vocalization)	Voiced sounds which do not indicate discomfort or distress, consisting of discrete sounds of a single breath, regardless of length of inflection.
Fuss (F) (Distress vocalization)	High-pitched, irregular vowel sounds; may be a whimper, whine, screech, suggesting discomfort, agitation, or complaint. Corners of mouth are truned down in a slight frown and corners of eyes are wrinkled.
	Maternal Behaviors
Look at Infant (L)	Mother looks at infant's face or any part of infant's body, hair or clothing.
Smile (S)	Widening of the mother's mouth, a deepening of grooves from up-turned corners of mouth to wings of nose, possible raising of cheek areas, narrowing of eyes and wrinkling in corners of eyes.
Vocalize (V)	Maternal verbalizations such as a word, sound or a series of words or sounds directed to the infant.
Tactile-Play (TP)	Any repeated tactile stimulation of infant by mother which has the explicit goal of alerting, amusing infant and is not part of the usual touching and moving of infant that is involved in caretaking.
Object-Play (OP)	Mother's use of her hand as play object, without physical contact with her infant, and in the absence of an actual toy.

Table VI-3
Infant and Mother Behavioral Codes

Infant Behavioral Codes

En Face Alone (EFA)
En Face/Smile (EFS)
En Face/Vocalize (EFV)
En Face/Smile/Vocalize (EFSV)
En Face/Fuss (EFF)
Orientation to Mother's Body Alone (OBA)
Orientation to Mother's Body/Smile (OBS)
Orientation to Mother's Body/Vocalize (OBV)
Orientation to Mother's Body/Smile/Vocalize (OBSV)
Orientation to Mother's Body/Fuss (OBF)
Off-gaze Alone (OGA)
Off-gaze/Smile (OGS)
Off-gaze/Vocalize (OGV)
Off-gaze/Smile/Vocalize (OGSV)
Off-gaze/Fuss (OGF)

Mother Behavioral Codes

Look at Infant (L)
Look at Infant/Smile (LS)
Look at Infant/Vocalize (LV)
Look at Infant/Smile/Vocalize (LSV)
Look at Infant/Tactile-Play (LTP)
Look at Infant/Smile/Tactile-Play (LSTP)
Look at Infant/Vocalize/Tactile-Play (LVTP)
Look at Infant/Smile/Vocalize/Tactile-Play (LSVTP)
Look at Infant/Object-Play (LOP)
Look at Infant/Smile/Object-Play (LSOP)
Look at Infant/Vocalize/Object-Play (LVOP)
Look at Infant/Smile/Vocalize/Object-Play (LSVOP)

Infant and Mother Additional Play Behaviors

Infant Behaviors	Maternal Behavior
Social Play with Object	Stimulate with Object
Manipulate Object	
Reach for Object	
Look at Object	

Table VI-4
Infant Repertoire: System for Clustering Behaviors

Behaviors

EF, OB, OG, S, V, F

Gaze-Alone	Acts
(EFA)	(S,V,F)
(OBA)	
(OGA)	

Gaze + Act

EFACT	OBACT	OGACT
EFS	OBS	OGS
EFV	OBV	OGV
EFSV	OBSV	OGSV
EFF	OBF	OGF

Key:

EF = Enface
OB = Orientation to Mother's Body
OG = Off-gaze

A = Alone
S = Smile
V = Vocalize
F = Fuss

Table VI-5

Maternal Repertoire: System for Clustering Behaviors

Behaviors

L, S, V, TP, OP

Non-Play Behavior	Play Behavior
NPB (L, LS, LV, LSV)	(TP,OP)

Play + Vocalization

Pass	TPNV	OPNV
NPV	TPV	OPV

Key:

L = Look at Infant
S = Smile
V = Vocalize
TP = Tactile-Play
OP = Object-Play
Pass = Passive (Non-Play, Non-Vocalize)
NP = Non-Play
NV = Non-Vocalize

another in their response to infant en face-fuss and vocalizations that were directed off-gaze or oriented to mother's body.

The findings suggest there are universal patterns of infant and mother attachment behaviors in dyads, irrespective of diagnosis. Specifically, the results substantiated the importance of en face behaviors as salient signals for the development of mother-infant reciprocal interactions with both Down syndrome and normal infants. Similarity in maternal response to en face-vocalization also provides support for the concept of universal maternal behaviors, and reflect a maternal sensitivity to the stimuli that elicit or maintain desired infant behavior.

Further, findings in this study suggest that stimulation of non-active infants is a pattern of maternal behavior that is present irrespective of diagnostic classification. This pattern, however, might be observed for longer periods of time in situations where children are relatively inactive. Finally, at the developmental period examined in this study, mothers demonstrated more responsiveness to infant language behavior than to infant smiling. It is likely that mothers "expect" language behavior and work to elicit it from their infants.

Several implications for research and practice derive from this study. The literature has documented the importance of en face-gaze at birth, and en face-smile at approximately three months. The results of this study provide support for the importance of infant en face-vocalization in the second quarter of life. However, additional research is needed to describe further developmental changes in critical infant behaviors and to examine the extent to which these behaviors are universally exhibited within different populations of at-risk and normal infants.

Results also suggest that infant orientation to mother's body was a common occurrence among the lowest aged infants in the study. Further research with larger populations is needed to confirm the significance of this behavior pattern within the repertoires of normally developing, Down syndrome, and other at-risk infants.

The results of this study also suggest that mothers develop individual modifications in response to inconsistent complex infant signals. It is possible that a predominant use of a non-dialogue communication style at one stage of the mother-infant relationship has long-term implications for modifications in maternal repertoires. More extensive longitudinal data is needed on length of delay in infant en face activity, nature of maternal adaptation and consistent long-term use of maternal adaptation.

Finally, the findings suggest the importance of extensive observation of the complexity of individual infant behavioral repertoires. It has been suggested that differences in the early signalling patterns of at-risk and normal infants disappear after the first few months. The lack of differences in infant behaviors may be artifactual. There is need to consider more complex behavior patterns, and to evaluate individual differences within, as well as between diagnostic groups.

Language and Mother-Child Interaction (Mahoney)

The studies conducted at least in part through Project REACH have dealt with the general problem of identifying factors which influence the development of children who have biological conditions associated with mental retardation. These studies have been designed and conducted under the philosophy of the transactional model of development. That is, data were collected that would either clarify or disconfirm the general belief that the cognitive and language development of young children who have medical conditions associated with moderate to severe mental retardation are influenced by the quality of their interactions with their primary caregivers as well as by the integrity of their own inherent characteristics. Although the major interest was in developing early intervention procedures, only one of the studies reported below was a direct intervention study, the other three being more basic studies of psychological and social characteristics. Nevertheless, the results from all of these studies make a significant contribution toward the goal of improving procedures for educating young mentally handicapped children.

The primary sample for our studies was sixty mother-child dyads, including twenty dyads each in which the children were either 12, 24, or 36 months of age. Table VI-6 presents a detailed description of this sample. The sample predominantly included children who had Down syndrome (90%) although some children had other conditions such as hydrocephaly and Williams' syndrome. Approximately 67% of the sample were recruited from the greater Los Angeles area, and the other third came from Chicago. All families were primarily English speaking but were distributed across the full range of Socio-Economic Status. Since 95% of the subjects came from intact families, the sample is thus likely to be unrepresentative of the average family structure of mentally handicapped children. This bias is unintentional, and probably resulted from our strategy of recruiting subjects through parent organizations rather than hospital records or intervention programs.

The mother-child pairs were visited in their homes by an observer and an assistant when the children were either 12, 24, or 26 months old. Data collection, which lasted approximately 4 hours, was divided into morning and afternoon sessions. During the morning session a free play observation was conducted. Free play occurred in the living rooms of the subjects' homes and lasted 20 minutes. The rooms were unaltered except that objects and obstacles which could have interfered with the free play tasks were removed from the room. All subjects were given the same toys to play with; a xylophone, wooden blocks, toy bus, books and stacking rings. Mothers were instructed to play with their child as naturally as possible. The entire free play session was recorded with a video tape recorder. After this the infants were administered the Uzgiris and Hunt Ordinal Scales of Mental Development and the mothers completed the Carey Infant Temperament Scale. The afternoon session was conducted after the children had rested. During this session the Bayley Scale of Mental Development and the Receptive-Expressive-Emergent-Language Scales by Bzoch and League were administered.

The first major problem investigated was to determine how differences in the quality of maternal communication was related to the rate of their children's language development. To investigate this issue we transcribed the videotape recordings of the free play session, making notations of each of the verbal and nonverbal attempts to communicate by either the mother or child. Nonverbal communication included all vocalizations, smiles, nods, and other

Table VI-6
Demographic Characteristics of Sample

Characteristic	Group I (n=20)	Group II (n=20)	Group III (n=20)	Total Sample (n=60)
Child's CA (months)	12.55	24.50	36.90	24.65
Sex				
Male	13	12	9	34
Female	7	8	11	26
Number of Siblings				
0	5	3	3	11
1	11	12	4	27
2	4	4	5	13
3	0	0	3	3
4	0	1	3	4
5	0	0	2	2
Child's Ordinal Position				
1	7	5	5	17
2	10	10	4	24
3	3	4	4	11
4			2	2
5		1	3	4
6			2	2
Mother's CA (years)	31.15	31.00	37.25	33.13
Mother's Education (years)	13.75	12.95	13.50	13.40
Mother's Marital Status				
Single		1		1
Married	20	19	18	57
Separated		0	1	1
Divorced		0	1	1
Mother's Occupation				
Housewife	14	15	12	41
Full-time	2	1	5	8
Part-Time	3	4	3	10
Unknown	1			1
Child's Etiology				
Down Syndrome	18	18	18	54
Other	1	0	2	3
Unkown	1	2	0	3
Mother's Ethnicity				
Caucasian	14	12	12	38
Asian		1	3	4
Hispanic	5	5	3	13
Black		2		2
Other	1		2	3
SES (Hollingshead)	41.40	40.75	45.65	42.58

body gestures which potentially conveyed intentional information. This yielded a corpus of 22,500 utterances/communication attempts. Each utterance was then classified on a variety of different dimensions that characterized their syntactic, semantic, and pragmatic/functional characteristics. Classification categories were designed to accentuate the potential didactic value of maternal language and thus focused precisely on how mothers responded to their children's language as well as how they attempted to elicit responses from their children. The results from this study are complex and cannot be presented in detail in this report. A more detailed report is currently being prepared and will be submitted for publication this summer in one of the major professional journals.

Table VI-7 presents a summary of the cognitive and language characteristics of this sample as assessed by standardized measures. The data indicate that the sample generally fell within the moderate range of mental retardation. It is of interest to note that the developmental decline in intellectual quotients that is typically reported for organically impaired children was also observed in our cross-sectional sample. This phenomenon is paralleled by, and may be an artifact of, a decreasing rate of language development. For example, while there was an average difference of 6½ months in receptive language age between 12 and 24 month old children, the differences between the 24 and 36 month old children was a little more than 4 months. This finding indicates either that our different age groups are representative of different populations or that the rate of language development of these children, which is substantially delayed even during the first year of life, decreases even more as the children grow older. Since there were not major differences between the various population parameters of the three groups (Table VI-6) the latter explanation, which is consistent with the conclusions from previous language studies, seems to be a more reasonable interpretation of these findings.

Table VI-8 presents a summary of the frequency with which various language and communication parameters were observed. The first finding of interest was that although there were some differences in the frequency of total communication attempts among the three age groups, these differences were not significant. However, there was a significant developmental trend for older children to communicate more frequently during the free play sessions than the younger children. Concomitant with this, mother's communication attempts accounted for a smaller percentage of the total communication attempts as the children grew older. In general these findings indicate that older children are more actively involved in communication than younger children.

A major focus of our analyses was on classifying the communicative function of each utterance. Several developmental trends emerged from this analysis of maternal language. First, there was a nonsignificant decrease in the number of behavior requests. Second, there was slight increase in the frequency with which mothers sought information. In this category, the frequency with which mothers elicited imitation from their children decreased while the number of times that mothers requested labels increased. Third, there was a significant decrease in the amount of social speech. Fourth, there was a significant increase in the frequency that mothers responded to their children's utterances.

Table VI-7

Cognitive and Language Characteristics of Sample

Test	Group I (n=20)	Group II (n=20)	Group III (n=20)
Bayley Mental Development Scale			
Mental Development Index	44.35	48.90	(a)
Developmental Age	7.3	15.10	19.30
Receptive Expressive Emergent Language Scale			
Receptive Language Age	8.68	15.33	19.42
Expressive Language Age	7.26	13.06	18.50
Uzgiris & Hunt Ordinal Scales[b] of Psychological Development			
Object Permanence (14)	3.84	12.56	12.2
Means-Ends (13)	9.9	9.61	11.2
Vocal Imitation (9)	3.05	4.11	5.73
Gestural Imitation (9)	2.11	6.82	8.42
Causality (7)	2.45	4.44	5.21
Spatial Relations (11)	5.55	10.00	10.57

(a) - 36 month MDI cannot be computed

(b) - number in parentheses is the number of steps for each subtest.

Table VI-8

Mother-Child Communication

Data Summary

Variables	Age					
	12		24		36	
Frequency of Communication Attempts	N	%	N	%	N	%
Mother	6227	87.6	5584	82.1	6486	78.8
Child	886	12.4	1218	17.9	1743	21.2
Total	7113	100.0	6802	100.0	8229	100.0
Maternal Language Function						
Verbal Stimulation	6070	97.4	5341	95.6	6096	94.0
Response to Child Communication	157	2.6	243	4.4	390	6.0
Behavior Requests	1374	22.1	1263	22.6	1275	19.7
Mild Command	791	12.7	820	14.7	875	13.5
Prohibition	106	1.7	135	2.4	122	1.9
Prompt	418	6.7	256	4.6	264	4.1
Seek Attention	59	0.9	49	0.9	14	0.2
Seek Information	1360	21.0	1138	20.4	1429	22.0
Simple Information	810	13.0	675	12.1	753	11.6
Elaborate Information	439	7.1	356	6.4	504	7.8
Label	238	3.8	321	5.7	330	5.1
Give Information Response	15	0.2	49	0.9	50	0.8
Demanding Elicit Imitation	893	14.3	727	13.0	579	8.9
Give Information	2160	34.7	1979	35.4	2292	35.3
Simple Information	275	4.4	315	5.6	433	6.7
Elaborate Information	666	10.7	516	9.2	866	13.4
Label	238	3.8	321	5.7	329	5.1
Deixis	86	1.4	100	1.8	81	1.2
Direct Attention	893	14.3	727	13.0	578	8.9

Table VI-8 (Con't)

	12		24		36	
	N	%	N	%	N	%
Social Speech	1050	16.9	778	13.0	911	14.0
Verbal Play	269	4.3	154	2.8	101	1.6
Motivate	240	3.9	201	3.6	354	5.5
Praise	211	3.4	175	3.1	180	2.8
Communication Prompt.	178	2.9	107	1.9	146	1.9
Noverbal Communication	171	2.7	170	3.0	183	2.8
Correct Articulation	2	0	12	0.2	35	0.5
Correct Grammar	0	0	1	0	14	0.2
Expansion	1	0	0	0	14	0.2
Imitation	5	0.1	22	0.4	55	0.8
Interpretation	1	0	4	0.1	37	0.6
Accept	1	0	15	0.3	39	0.6
Negate	0	0	0	0	3	0
Respond to Nonverbal						
Interpret Nonverbal	4	0.1	1	0	17	0.3
Accept Nonverbal	0	0	17	0.3	3	0
Imitate Nonverbal	55	0.9	59	1.1	23	0.4
Respond to Nonverbal	85	1.4	106	1.9	124	1.9
Child Communication						
Spontaneous Communication	858	96.8	1128	92.5	1513	86.8
Meaningless Communication	658	74.3	689	56.5	1011	58.0
Elicited Communication	28	3.2	91	8.5	226	13.0
Topic (Mother)						
Initiate Topic	2874	46.2	2767	49.6	3109	48.0
Elaborate Topic	1950	31.3	1543	27.6	2100	32.3
Respond to Child's Topic	263	4.2	375	6.7	532	8.2
Repetition	1127	18.0	886	15.8	731	11.2

Table VI-8 (Con't)

	12		24		36	
	N	%	N	%	N	%
Syntax (Mother)						
One Word	1491	23.9	1646	29.5	1593	24.6
Ungrammatical	1599	25.7	1376	24.6	1476	22.8
Grammatical	3133	50.3	2560	45.8	3410	52.6
Mood (Mother)						
Declarative	2997	48.1	2716	48.6	3310	51.1
Interrogative	1983	31.9	1582	28.3	1943	30.0
Imperative	912	14.6	947	17.0	1004	15.5
Exclamatory	334	5.4	339	6.1	217	3.4
Mean Morpheme (Mother)	3.28		3.05		3.65	

These developmental patterns suggest that mothers make modifications in their speech that complement the increasing communicative and cognitive competence of the children. The finding that fewer behavior requests and more information requests were addressed to older children than to younger children suggests that as children develop, mothers use language less as a means for controlling their children and more as a means of engaging them in verbal discourse. Mothers of older children also tend to respond to their children's vocalization more as meaningful attempts to communicate than do mothers of younger children. This is consistent with our analysis of the children's language that indicated that even though almost no spontaneous verbalizations occur at any of the three age levels, older children tend to produce meaningful nonverbal vocalizations more frequently than younger children.

There were two findings regarding maternal language that were unexpected, but which on closer analysis were consistent with the literature on maternal language. The first finding, which was derived from a mother-child discourse measure, indicated that there was a decrease in the frequency with which mothers elaborate topics which children initiate from 12 to 24 months, and then an increase in the frequency of this discourse parameter at 36 months. A parallel finding was that the syntactic complexity of maternal language as measured by MLU decreased from 12 to 24 months and increased from 24 to 36 months. We had expected that these parameters should increase at all three age levels in response to the increasing complexity of the children's speech. However, a similar decrease in MLU has been reported with normal infants whose chronological age is roughly comparable to the language ages of the children in our sample. That is, among normal children maternal language complexity has been observed to decrease from 9 to 12 months and then increase from 12 to 18 months.

While the developmental trends in maternal language are consistent with the patterns that have been observed among mothers of normal children, these findings do not indicate how variations in maternal communication influence children's rate of language development. To investigate this issue we computed the correlations between various language parameters and the children's Receptive and Expressive Language Ages. Correlations between language measures and cognitive measures and between language and selected demographic measures were also computed so that the potential contribution of maternal language variables to children's language development could be compared to the potential contribution of these other variables. Selected findings from these correlations are reported in Table VI-9.

In general, these results suggest that for the total sample there are strong correlations between the various cognitive measures and receptive and expressive language measures. While the correlations of the Bayley and Uzgiris-Hunt measures with the language measures were near zero for the 12 month sample, correlations increased substantially for the 24 and 36 month old samples. The strongest correlations were between Developmental Age and Receptive and Expressive language at 24 months, and between all Uzgiris-Hunt subtests and Receptive language at 36 months. There were also significant correlations between maternal education and children's language development. These correlations, however, were not significant for the 36 month old sample, although they were significant for the 12 and 24 month samples.

Table VI-9

Significant Correlations Between Language Variables and Selected Demographic Cognitive and Maternal Language Variables

	12 mos.		24 mos.		36 mos.		Total Sample	
Variables	RLA	ELA	RLA	ELA	RLA	ELA	RLA	ELA
Sex					.58		.26	.28
Days of Hospitalization		.36						
Mother's Education	.47	.43	.72	.76			.50	.50
Uzgiris & Hunt								
Object Permanence			.86	.89	.64		.74	.71
Means Ends					.65			
Vocal Imitation				.04	.78		.58	.60
Gestural Imitation					.76		.67	.68
Causality					.58		.43	.42
Spatial Relations			-.53		.70		.47	.43
Bayley								
Developmental Index								
Developmental Age			.57	.66	.34		.64	.65
Maternal Language								
Verbal Stimulation	.40		.40			-.41		-.23
Behavior Requests		-.54					-.21	-.26
Information Requests		.35						
Give Information	.39	.44						
Social Speech			.41					
Nonverbal Communication								
Respond to Child's Communication	-.41		-.39	-.22		.40		.24
Correct							.35	.38
Expansion					.45	.42	.22	.29
Imitation						.38	.25	.35
Interpretation							.33	.30
Accept						.36		
Negate								.20
Respond to Nonverbal		-.38					-.23	
Utterances per Minute		.30			.38			

In contrast to these correlations, there were few significant correlations between maternal language variables and children's rate of language development. The frequency of verbal stimulation correlated negatively to the Expressive language development for the total sample, but correlated positively to Receptive language development of the 12 and 24 month old samples. Behavior requests had a negative correlation to language development for the total sample and this relationship was even stronger with the Expressive language development of the 12 month old sample. The frequency with which mothers gave information and requested information correlated to the language development of the 24 month olds, but none of these measures correlated to the language development of the total sample. Frequency of responding to the child's vocalization correlated positively to the rate of language development for the total sample and 36 month olds, but was negatively correlated to the language development of the 12 and 24 month old children.

While our analyses of these language data is not yet complete, there are a few generalizations that seem warranted at this time. First, the magnitude of the relationship between maternal language and children's rate of language development does not seem to be as great as is the relationship between the children's cognitive development and language development. Second, the impact of various factors on children's rate of language development seems to change developmentally. Maternal language seems to have a greater impact on the rate of language development of 12 and 24 month old children than it does on 36 month old children, while cognitive development has a greater impact on the rate of language development of 24 and 36 month old children than on 12 month old children. Third, there is some indication that differences in maternal language style may be related to the amount of education that the mothers have had. This conclusion is very tentative, however, since it is derived only from common correlation patterns between maternal language variables and maternal education with children's rate of language development.

A second study was conducted using the same data in which we investigated the relationship between the behavioral style of the mothers while interacting with their children and the children's rate of cognitive development as indicated by the measure of developmental age. Research and theory regarding interaction between mothers and normally developing children suggest that there is a significant relationship between the quality of the mother-child relationship and the infant's cognitive development and psycho-social competence. Attachment theory suggests that the affective relationship between mothers and their young children forms the basis for children's early sensorimotor and language development. The purpose of this study was to determine how the quality of maternal behavior related to the development of children who have biological handicaps associated with mental retardation. Specifically two issues were investigated. The first was to determine whether there is a systematic relationship between concurrent measures of maternal behaviors and children's cognitive functioning. The second was to determine how the relationship between the behavior of the mothers' and children's competence changes at different stages of children's development.

Two behavior rating scales were developed for assessing maternal behavior. One was a global rating scale designed to assess general characteristics of the mother's behavior which previous research has indicated is related to the cognitive development of normal children. This included categories such as expressiveness, warmth, sensitivity, understanding, responsivity, inventiveness, etc. The other was a time sampling behavior rating scale designed to assess general behaviors that occur during the play session. Two observers were then trained to use these scales to code the first ten minutes from each videotaped play session.

Results of this investigation indicated that mothers behave differently while interacting with their one-, two-, and three-year-old children, and that maternal behavior was significantly related to the children's cognitive development. Multiple regression analyses using maternal behavior rating and behavior frequency variables to predict concurrent mental development index for the total sample indicated that children's intelligence was predicted by the behavior rating, Maternal Sensitivity to the Child's Interests. Additional regression analyses revealed that different maternal behaviors related to cognitive development at each age. Specifically, maternal sensitivity and permissiveness were related to cognitive development in one-year-olds; maternal effectiveness in achieving the child's cooperation and approval predicted concurrent development in two-year-olds; and maternal understanding and non-directiveness were related to cognitive development in three-year-olds.

The following two studies were not proposed as part of the REACH program project, but were nevertheless supported partly by Project REACH funds and included some of the children from our original sample. The first study (Mahoney, Glover & Finger, 1981) compared the relationship between sensorimotor development and language development among Down syndrome and nonretarded children. Uzgiris and Hunt's Ordinal Scales of Psychological Development and the Receptive and Expressive Emergent Language (REEL) scale of Bzoch and League were administered to 18 Down syndrome and 18 nonretarded children who had matched developmental ages of approximately 17 months. Comparison of the resulting scores are presented in Table VI-10 and indicate that although there were no differences between the groups on four subscales of the Uzgiris and Hunt, there were significant differences in favor of the nonretarded children in the Vocal Imitation subscale of the Uzgiris and Hunt and on Receptive and Expressive scales of the REEL. These results indicate that Down syndrome children are delayed in their language development compared to nonretarded children of the same developmental age. This language delay appears to be related to deficiencies in vocal imitation skills but is not related to general sensorimotor functioning.

In another study Mahoney and Weller compared the relative effectiveness of total communcation and oral communication training in a parent-assisted home-based language intervention program. Two groups consisting of a total of 15, 18 to 36 month old Down syndrome children received systematic language training for five months. The children and their mothers were visited weekly in their homes by a language trainer for two months. During this time mothers received instruction on methods for implementing the Environmental Language Intervention program of MacDonald and Nickols either by using oral or total communication as a training modality. Each week mothers were given language training activities and specific language targets to implement. From the third to fifth months mothers implemented language intervention activities without direct assistance from the language trainer. Results from this study are presented in Table VI-11 and include the comparisons of the mean scores of the two groups on several cognitive and language measures including the Bayley Mental Development Scale, and Environmental Pre-

Table VI-10

Mean Scores of Subjects on the REEL and the Uzgiris-Hunt Scales

	Nonretarded				Down syndrome			
			Total				Total	
	Male (n=9)	Female (n=9)	Mean	SD	Male (n=9)	Female (n=9)	Mean	SD
REEL[a]								
Receptive	18.7	20.89	19.78*	6.54	15.4	15.89	15.67	5.01
Expressive	14.6	18.56	15.55*	5.04	14.1	12.89	13.50*	4.03
Uzgiris-Hunt Scales[b]								
Object Permanence (14)[b]	11.4	12.22	11.83	2.28	10.9	11.89	11.39	3.00
Means-End (13)	10.0	9.78	9.89*	1.64	10.6	11.11	10.83*	.92
Vocal Imitation (9)	5.7	6.11	5.89*	2.30	4.4	4.33	4.39*	1.97
Gestural Imitation	6.2	6.22	6.22	2.29	7.1	7.78	7.74	1.92
Causality (7)	5.9	5.00	5.44	1.69	4.9	5.78	5.33	1.03
Spatial Relations (11)	10.7	9.89	10.28	5.78	10.1	10.78	10.44	1.04

[a] Receptive and Expressive Emergent Language Scale. Age level scores reported in months.

[b] Numbers in parentheses indicate the number of steps on subscale. Scores are based on the highest step passed.

* $p < .05$.

Note. There were 9 males and 9 females in each group.

REEL = Receptive and Expressive Emergent Language.

Table VI-11

Means and Standard Deviations of the Pre- and Post-Intervention Language Measures for the Oral and Total Communication Groups

	Pre-test Scores						Post-test Scores					
	Oral			Total Communication			Oral			Total Communication		
Language Measures	Total (n=7)	Boys (n=3)	Girls (n=4)	Total (n=8)	Boys (n=5)	Girls (n=3)	Total (n=7)	Boys (n=3)	Girls (n=4)	Total (n=8)	Boys (n=5)	Girls (n=3)
RLA	14.29 (5.19)	13.33 (6.11)	15.0 (5.23)	17.25 (4.89)	15.60 (4.34)	20.00 (5.29)	21.0 (5.74)	19.33 (3.06)	22.25 (7.41)	23.75 (5.50)	22.0 (4.64)	26.67 (6.51)
RLQ	52.43 (17.74)	50.0 (23.81)	54.25 (15.52)	58.63 (11.82)	55.00 (12.39)	64.67 (9.7)	62.0 (9.95)	60.33 (8.08)	63.25 (12.23)	67.63 (11.22)	63.4 (10.24)	74.67 (10.6)
ELA	14.14 (3.85)	12.67 (3.06)	15.25 (4.43)	15.38 (4.44)	13.8 (3.49)	18.0 (5.29)	20.57 (5.26)	18.0 (4.0)	22.5 (5.74)	21.25 (6.23)	19.2 (3.35)	24.67 (9.24)
ELQ	52.37 (15.47)	47.67 (12.42)	56.25 (18.26)	52.13 (9.73)	48.6 (8.11)	58.0 (10.82)	60.86 (11.89)	56.33 (11.37)	64.25 (12.69)	58.75 (12.8)	54.2 (6.87)	66.33 (18.48)
EPBNV	54.71 (29.53)	45.67 (27.23)	61.5 (33.27)	67.75 (17.2)	65.20 (15.94)	72.0 (22.0)	84.43 (16.37)	78.0 (24.33)	89.25 (8.3)	94.25 (10.78)	93.4 (13.15)	95.67 (7.51)
EPBV	22.43 (11.86)	16.6 (9.87)	26.75 (12.58)	21.25 (15.21)	21.0 (16.51)	21.67 (16.26)	42.86 (19.01)	36.0 (20.81)	48.0 (18.76)	46.25 (23.02)	43.6 (23.14)	50.67 (27.15)
Words-Spoken	9.14 (6.64)	6.67 (.58)	11.0 (8.87)	14.63 (11.63)	10.80 (6.76)	21.0 (16.37)	37.71 (31.04)	16.00 (5.29)	54.00 (32.91)	45.63 (37.21)	31.60 (18.04)	69.0 (53.69)
Words Signed	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	20.88 (4.70)	21.40 (5.46)	20.0 (4.0)
Total							37.71 (31.04)	16.00 (5.29)	54.00 (32.91)	66.5 (38.10)	53.0 (17.23)	89.0 (57.19)

RLA = Receptive Language Age in Months
RLQ = Receptive Language Quotient
ELA = Expressive Language Age in Months
ELQ = Expressive Language Quotient
EPBNV = Environmental Prelanguage Battery - Nonverbal Subtests
EPBV = Environmental Prelanguage Battery - Verbal Subtests
Words-Spoken = Words Spoken (and signed)
Total Lexicon = Words Spoken Plus Words Signed-Only

language Battery and the Receptive and Expressive Emergent Language Scale. Although children in the total communication group successfully acquired signs, there were no significant differences between the groups in their rate of language and cognitive development.

In conclusion, four studies were conducted which attempted to delineate factors which influence the rate of language and cognitive development of mentally handicapped infants. Since results from three of these studies suggest that the circumstances associated with the development of these children are similar to those that have been identified among nonhandicapped children, the studies are supportive of the developmental model of mental retardation. However, these studies extend beyond what is typically reported as supportive of a developmental model. That is, not only did we find similarities between the quality of sensorimotor development and the relationship between sensorimotor and language development between mentally handicapped and nonhandicapped children, but also we found that mothers interact with mentally handicapped children similar to the manner in which mothers interact with nonhandicapped children. Furthermore, the same maternal behaviors that appear to influence the development of mentally handicapped children also influence nonhandicapped children.

The rate of development of mentally handicapped children thus appears not only to be influenced by intrinsic factors such as sensorimotor functioning, but is also related partly to the quality of stimulation which these children receive. However, differences observed in patterns of maternal stimulation accounted for less than 15% of the variance in the children's rate of development. Furthermore, the influence of qualitative differences in maternal stimulation diminished as the children grew older. These results suggest that, at least for the behaviors with which we were concerned, the relative impact of the environmental component of the transactional model of development diminishes as the children grow older.

Our studies also indicate that the rate of language development of mentally handicapped children is partially impeded by an extreme delay in their rate of development of vocal imitation. While most aspects of sensorimotor development are commensurate with the developmental ages of these children, vocal imitation appears to lag significantly behind these other skills. We have no explanation for this finding, although we believe that patterns of early mother-infant interaction could explain this phenomenon. Nevertheless, the findings from our language training study have significant implications for children with a vocal imitation deficit. Our language training study suggests that even very young mentally handicapped children can learn sign language, and that this modality does not interfere with their rate of oral language development. A reasonable language intervention strategy for children who are deficient in vocal imitation, but who have otherwise developed adequate sensorimotor skills for acquiring language would be to begin to teach these children to use sign language. This might enable these children to develop language in the gestural modality while their vocal modality was still developing, and would accelerate the age at which these children may begin to communicate with language. This advantage could potentially have a positive impact on these children's rate of social development.

Materials have been or are being prepared for publication and presentation as shown in the following listing.

Mahoney, G., Glover, A., & Finger, I. The relationship between language and sensorimotor development among Down's syndrome and developmentally normal children. *American Journal of Mental Deficiency*, 1981, *86*, 21-27.

Mahoney, G. The relationship of mother/child language interaction to language programs. California State University, Los Angeles, Department of Special Education, July 1978.

Mahoney, G. The relationship of mother/child language interaction to language intervention programs. North Los Angeles Regional Center, October 1978.

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Mahoney, G. The relationship of mother/child language interaction to language intervention programs. East Los Angeles Regional Center, October 1978.

Mahoney, G. The linguistic environment of the mentally retarded child. Annual Convention of the American Association on Mental Deficiency, Miami, Florida, May 1979.

Mahoney, G., & Glover, A. T. The relationship of sensorimotor development to the development of language in mentally retarded and nonretarded children. Paper presented at the Tenth Annual International Interdisciplinary UAP Conference on Piagetian Theory and its Implications for the Helping Professions, Los Angeles, California, 1980.

Mahoney, G., & Weller, E. Effectiveness of total and oral communication training in a parent-assisted home-based language intervention program. In preparation.

Assessments and Intervenors

(Johnson, Munroe, & Kopp)

Infant Assessments (Johnson & Kopp)

Developmental tests are invaluable sources of information about infants with problems (Honzik, 1976). They permit a general appraisal of normal versus delayed performance, and aid the interpretation of infant abilities and problem areas. Used in conjunction with other clinical techniques, they lend support to differential diagnoses.

Whereas only a handful of developmental tests existed a decade ago, today more than 100 have been identified (Brooks & Weinraub, 1976; Honzik, 1976; Johnson & Kopp, 1981; Stott & Ball, 1965; Thomas, 1970). These tests range from brief screening techniques to detailed, standardized assessments of infant performance. They are used not only for diagnosis and research, but also for assessment, evaluation of intervention procedures, and to monitor infant progress.

The dramatic increase in infant tests is not necessarily cause for concern, however, discord and confusion have arisen because of the nature and number of tests that are now available. Questions have surfaced in meetings devoted to the topic (Black, 1979; Darby & May, 1979), and in informal conversations with interveners working with infants. It was this pressing need for information which led us to initiate an extensive analysis and evaluation of available infant tests.

Three different products have resulted from our analyses. The first is a bibliography that contains information about close to 100 infant screening and assessment measures (Johnson & Kopp, 1981). Details are provided about test goals, intended population, content, administration and scoring, validity and reliability. Names and addresses of test authors/publishers are also listed. The bibliography, which has been available from Project REACH, has been requested by more than 1,000 individuals and has been revised for a third printing.

A second product took the form of an overall analysis of the quality and standards of infant tests in general. All tests, regardless of focus, ought to conform to certain guidelines of administration and scoring, and meet standards for reliability and validity. These are stated in the APA/AERA/NCME Standards for Educational and Psychological Tests (1974). A large group of infant developmental tests was compared to these published standards in order to highlight strengths and weaknesses. Excluded were measures devoted exclusively to the evaluation of language, vision and hearing, Piagetian constructs, the neonatal period, or home environment. Furthermore, with the exception of several "classic" measures, only tests developed after 1950 were included.

A uniform coding procedure was developed which included information about intended population, purpose and rationale, the kinds of content domains assessed, as well as the number of items in each domain, administration and scoring procedures, data on standardization, reliability and validity, and test reference information. Only explicitly stated information was coded. In addition, codes such as "unspecified" or "no information given" were employed to handle missing or vague information. Two coders analyzed the tests; inter-observer reliability was analyzed for twelve tests, and ranged from 87% to 97% with a mean of 92%.

Using the Standards for Educational and Psychological Tests as criteria, the infancy measures, taken as a group, were evaluated with respect to their strengths and weaknesses. Findings are as follows:

1. Intended population. The standards recommend a clear statement of a measure's intended population. Most of the infancy measures contained specifications about appropriate age ranges (79%) and the type of infant for which they were developed (67%).

2. Purpose and rationale. The standards call for explicit statement of purpose and rationale. Ninety-five percent of the infancy measures contained information about their general purpose (e.g., assessment, screening or diagnosis), and 88% provided details regarding more specific purposes (e.g., providing a developmental profile or formulating behavioral objectives). As for rationale, 77% of the measures included a statement of this nature.

3. Content. The standards state that a test manual should fully describe the specifications followed in "writing items or selecting observa-

tions." Examination of the infancy measures reveals extensive use of previously published test items. This strategy is not a recent innovation, indeed, Honzik (1976) noted that many of the earlier test developers "raided the Gesell schedules for test items, with appropriate acknowledgement of indebtedness" (p. 63). However, in the sample of tests, referencing sources of items or specifying the criteria by which items were selected for inclusion received very low priority. Only 26% of the measures explicitly stated the sources from which their items were drawn, while 36% provided no information at all. The remainder simply furnished a general bibliography. Less than one-fifth specified the criteria used to select items.

4. Administration and scoring procedures. The standards stress the importance of providing instructions comprehensive enough to permit and encourage each test user to follow identical procedures. Twenty-seven percent of the tests failed to specify administrator, 60% did not mention test setting, and 30% did not indicate whether the measure was to be administered individually or in a group. General administration instructions were not provided for almost half the measures. Thus, the user of many infancy measures does not receive instructions about the importance of establishing rapport with the infant, recommendations as to the order in which to administer items, or advice about structuring the testing situation to minimize distractions.

As for administering and scoring individual test items, only 40% furnished a complete description and procedure for each item, and even fewer gave scoring criteria. In the majority of cases, the test user is presented with a list of infant behaviors and must devise administration and scoring procedures.

5. Technical information. The standards call for information on standardization, reliability, and validity. Less than one-third of the measures were standardized. In most of these cases, the standardization involved the use of small samples and/or unequal distributions of children across different ages. One-half of the remaining tests used items and age placement data from previously published measures, the other half failed to specify how age placements were determined. Finally, contrary to standard specifications, less than one-third of the infancy measures provided any information on reliability or validity.

In sum, comparison with published test standards demonstrated that many measures designed to assess general infant performance did not provide essential information. Failure to meet test standards does not necessarily render a measure useless, but it does place a sizeable burden on the potential interpreter of the test. Moreover, inaccurate assessment of an infant's current developmental status may lead to inappropriate diagnosis and care.

The findings clearly point to the need for child development specialists to appraise the status and use of infant tests. Perhaps it would be helpful if infant specialists from both research and clinical practice worked together to strengthen and refine a) tests for handicapped infants, and b) assessment measures that could be used by people who do not have advanced training in infant development but who nevertheless are engaged in providing services to infants. This kind of collaborative strategy could eventually yield a number of valid and reliable measures that would permit test users to select a test from among a small number of comprehensive and sound measures.

Finally, a third product involved the production of an annotated bibliography of published infant screening and assessment measures. This bibliography also provides a listing of tests either specifically designed for use with handicapped children or at least applicable to handicapped samples. The annotated bibliography follows in Table VI-12, and provides more detail about tests for the interested reader.

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Table VI-12
Annotated Bibliography of Tests for Infants

Test	Age Range	Content Areas (defined by test authors)	Clarification of Content Areas	Total Items/ Items 0-3 Years	Scoring	Standardization	Reliability	Validity: Content or Concurrent	Source of Items
I. Screening Measures									
A. Normal (or unspecified) Population									
Denver Developmental Screening Test (Frankenburg & Dodds, 1968)	0-6 yrs.	GM, FM/Adap, Lang, PS	Lang (R&E), a few SH	105/75[a]	Diagnostic category[b]	1036 normal children	Test-retest inter-observer, 32 normal children	Concurrent, 236 normal children	Surveyed literature & existing tests, general bibliography
Developmental Screening Inventory, Knobloch, Pasamanick, & Sherard (Note 1)	1-18 mo.	GM, FM Lang, Adap, PS	Lang (R&E); SH	171/171	Summary score for each content area, diagnostic category, developmental age	From other tests	- - -	- - -	Listed in manual
Minnesota Child Development Inventory (Ireton & Thwing, 1974)	1-6 yrs.	General Dev, GM, FM, Lang (E), Comprehension-Conceptual, Situation Comprehension, SH, PS	L(R)	320/238	Summary score for each content area, developmental profile, all report items	796 normal children	Split-half, 804 normal children	796 normal children	Surveyed literature & existing tests, some original items, no bibliography
Performance Objectives for Preschool Children (Schirmer, 1974)	0-6 yrs.	GM, FM, Lang/Speech Cog, Self-care, Social	Lang (R&E); Preacademic for 5-6 yr. olds	937/384	Items scored individually	From other tests	- - -	- - -	Surveyed literature & existing tests, general bibliography
B. Handicapped Population									
Boyd Developmental Progress Scale (Boyd, 1974)	0-8 yrs.	Motor; Communication; Self Sufficiency	GM, FM, Lang (R&E), a few Cog	150/125[a]	Summary score for each content area, developmental profile and age[b]	From other tests	- - -	- - -	Surveyed literature and existing tests, no bibliography

Test	Age Range	Content Areas (defined by test authors)	Clarification of Content Areas	Total Items/ Items 0-3 Years	Scoring	Standardization	Reliability	Validity: Content or Concurrent	Source of Items
Developmental Activities Screening Inventory (DuBose & Langley, 1977)	6 mo.- 5 yrs.	Cog	FM	55/30[a]	Summary score for each content area, developmental age and quotient[b]	- - -	- - -	Concurrent, 101 normal and handicapped children	General bibliography
Maxfield-Bucholz Scale of Social Maturity (Maxfield & Bucholz, 1957)	0-5 yrs.	SH (General, Dressing, Eating), Communication, Socialization, Locomotion, Occupation		95/55	Overall Summary score, all caregiver report items[b]	398 handicapped children	- - -		Some listed in manual, general bibliography
Valett Developmental Survey of Basic Learning Abilities (Valett, 1966)	2-7 yrs.	Motor integration/ Physical dev, Visual-motor coordination, Lang dev/ Verbal fluency, Conceptual dev, Discrimination (tactile, auditory, & visual)	GM, L(R&E), Cog, Perception	233/53	Summary score for each content area, developmental age	From other tests	- - -	- - -	Surveyed literature & existing tests, reference given for each item, listed in manual and bibliography
C. Normal and Handicapped Population									
Alpern-Boll Developmental Profile II (Alpern, Boll, & Shearer, 1980)	0-9 yrs.	Physical, Communication, Academic, SH, Social	GM, FM, Lang (R&E)	186/87	Summary score for each content area, IQ type score, developmental profile and age, may be all parent or teacher report items[b]	3008 normal children	Test-retest inter-observer, 12 children	Concurrent, 188 normal and handicapped children	Surveyed literature & existing tests, some original items, no bibliography

Test	Age Range	Content Areas (defined by test authors)	Clarification of Content Areas	Total Items/ Items 0-3 Years	Scoring	Standardization	Reliability	Validity: Content or Concurrent	Source of Items
Preschool Attainment Record (Dole, 1966)	0-7 yrs.	Physical: Ambulation, Manipulation Social: Rapport, Communication, Responsibility Intellectual: Information, Ideation, Creativity	Lang (E), SH	112/48	Summary score for each content area, overall summary score, developmental age	From other tests	- - -	- - -	- - -
Slosson Intelligence Test for Children and Adults (Slosson, 1963)	Birth thru adulthood	Cog		194/60	IQ type score	From other tests	Test-retest, 139 normal and handicapped children	Concurrent, 737 normal and handicapped children	Listed in manual
Vineland Social Maturity Scale (Doll, 1965)	Birth thru adulthood	SH (General, Eating, Dressing), Locomotion, Self-direction, Socialization		117/44	Overall summary score developmental age, all report items[8]	620 normal individuals	Test-retest, inter-observer 373 handicapped children	Concurrent, 549 handicapped children	General bibliography

II. Assessment or Diagnosis Measures

A. Normal (or unspecified) Population

Test	Age Range	Content Areas (defined by test authors)	Clarification of Content Areas	Total Items/ Items 0-3 Years	Scoring	Standardization	Reliability	Validity: Content or Concurrent	Source of Items
Assessment-Programming Guide for Infants and Preschoolers (Umansky, 1976)	0-6 yrs.	Motor, Percept-motor Lang, Cog, SH, PS	Lang (R&E)	384/241	Summary score for each content area, overall summary score, developmental profile and age	From other tests	- - -	- - -	Surveyed literature and existing tests, general bibliography

Test	Age Range	Content Areas (defined by test authors)	Clarification of Content Areas	Total Items/ Items 0-3 Years	Scoring	Standardization	Reliability	Validity: Content or Concurrent	Source of Items
Bayley Scales of Infant Development (Bayley, 1969)	1-30 mo.	Mental, Motor, Infant Behavior Record		274/274[a]	Summary score for each content area (mental and psycho-motor developmental index), mental and psycho-motor ages[b]	1262 normal children	Test-retest, inter-observer, split-half, 1380 normal children	Concurrent, 120 normal children	Some listed in manual, general bibliography (In original 1933 publication, surveyed existing tests)
Carolina Developmental Profile (Lillie & Harbin, 1976)	2-5 yrs.	GM, FM, Lang (R&E), Reasoning, Visual Perception		83/25[a]	Summary score for each content area, developmental profile[b]	From other tests	- - -	- - -	Surveyed literature and existing tests, general bibliography
Cattell Infant Intelligence Scale (Cattell, 1940)	2-30 mo.	Mental	FM	95/95[a]	IQ type score[b]	274 normal	Split-half, 35 normal children	Concurrent, 35 normal children	Surveyed literature & existing tests, some given in text of manual
Delco-Elfman Developmental Achievement Test (Elfman, 1974)	6 mo-6 yrs.	Physical (mobility, visual motor), Social (Oral Comm., SH, Interpersonal), Intell. (information, cog, oral comp/memory)	Lang (R&E)	96/48	Overall summary score, developmental age	- - -	- - -	- - -	- - -
Inventory of Early Development (Brigance, 1978)	0-7 yrs.	Pre-ambulatory Motor, GM, FM, SH, Pre-speech, Speech & Lang., Gen. Knowledge & Comprehension, Readiness, Reading, Manuscript, Basic Math	Lang (R&E)	705/369[a]	Items scored individually[b]	From other tests	- - -	- - -	Surveyed literature and existing tests, references given for each content area, listed in a bibliography

Test	Age Range	Content Areas (defined by test authors)	Clarification of Content Areas	Total Items/ Items 0-3 Years	Scoring	Standardization	Reliability	Validity: Content or Concurrent	Source of Items
Koontz Child Developmental Program (Koontz, 1974)	1 mo-4 yrs.	GM, FM, Lang (R&E) Social	SH	412/374	Summary score for each content area, developmental age	From other tests	Inter-observer, 23 children	34 handicapped children	Surveyed literature & existing tests, consulted experts, some listed in manual, general bibliography
Minnesota Preschool Scale (Goodenough, Maurer, Van Wagenen, 1940)	18 mo-5 yrs.	Mental	FM	135/--[a]	IQ type score[b]	900 normal children	Test-retest, split-half, 900 normal children	- - -	Some original items, no bibliography
B. Handicapped Population									
Behavioral Characteristics Progression Santa Cruz Special Education Management System, 1973	Unspecified	59 "behavioral strands" (grooming, sensory perception, visual motor, gross motor, lang, comprehension, listening, etc.)	GM, FM, Lang (R&E) Cog, SH, PS, Percep, Other	2400/--	Items scored individually	Unstandardized	- - -	- - -	Some original items, no bibliography
Bridgeport Developmental Evaluation Procedure (Lombardi & Van Kirk, 1977)	0-3 yrs.	GM, FM/Adaptive, Speech/Lang, PS	Lang (R&E) SH	325/325	Summary score for each content area, overall summary score, developmental profile and age	From other tests	- - -	- - -	Listed in manual
Developmental Potential of Preschool Children (Haeusserman, 1958)	2-6 yrs.	Unspecified	Cog	40/--[a]	Items scored individually	- - -	- - -	- - -	Some original items, general bibliography

Test	Age Range	Content Areas (defined by test authors)	Clarification of Content Areas	Total Items/ Items 0-3 Years	Scoring	Standardization	Reliability	Validity: Content or Concurrent	Source of Items
Early Intervention Developmental Profile (Rogers, D'Eugenio, Brown, Donovan & Lynch, 1977)	0-3 yrs.	GM, FM/Perceptual, Lang, Cog, Self-care Social/Emotional	Lang (R&E)	274/274[a]	Summary score for each content area, developmental profile[b]	From other tests	Test-retest, inter-observer, 18 children	Concurrent, 14 children	Surveyed literature & existing tests, some original items, general bibliography
Early Learning Accomplishment Profile for Developmentally Young Children (Glover, Preminger, & Sanford, 1978)	0-3 yrs.	GM, FM, Lang, Cog, SH, Social/ Emotional	Lang (R&E)	412/409[a]	Summary score for each content area, developmental profile and age[b]	From other tests	- - -	- - -	Reference for each item, listed in a bibliography
EMI Assessment Scale, Elder, 1975	0-2 yrs.	GM, FM, Lang, Cog, Social	Lang (R&E)	360/360	Items scored individually	From other tests	- - -	- - -	Listed in a bibliography
KIDS Inventory of Development Scale (Project KIDS, Note 2)	0-6 yrs.	GM, FM, Cog/Lang, SH	Lang (R&E)	320/211[a]	Items scored individually, developmental profile, some caregiver report items[b]	From other tests	- - -	Content	Surveyed literature and existing tests, listed in a bibliography
Learning Accomplishment Profile (Sanford, 1974)	1 mo-6 yrs.	GM, FM, Lang, Cog SH, Social	Lang (R&E)	487/283[a]	Summary score for each content area, developmental profile, rate of development[b]	From other tests	- - -	- - -	Reference for each item, listed in a bibliography
Lexington Developmental Scales (United Cerebral Palsy of the Bluegrass, 1977)	0-6 yrs.	Motor, Lang, Cog, PS	GM, FM, Lang (R&E) a few SH	424/283[a]	Summary score for each content area, DQ score, developmental profile and age	From other tests	Inter-observer, 77 children	Content, concurrent, 57 children[c]	Surveyed literature & existing tests, some original items, general bibliography

Test	Age Range	Content Areas (defined by test authors)	Clarification of Content Areas	Total Items/ Items 0-3 Years	Scoring	Standardization	Reliability	Validity: Content or Concurrent	Source of Items
Memphis Comprehensive Developmental Scale (Quick, Little & Campbell, 1974)		GM, FM, Lang, Perceptuo-Cog, PS	Lang (R&E), SH	260/156	Summary score for each content area developmental profile and age	- - -	- - -	- - -	- - -
Sewall Early Education Developmental Profiles (Herst, Wolfe, Jorgensen, & Pallan, 1976)	1 mo-4 yrs.	GM, FM, Lang (R&E), Adaptive/Reasoning, Feeding, Dressing/Hygiene, Social/Emotional		754/676	Summary score for each content area, developmental profile	From other tests	- - -	- - -	Surveyed literature & existing tests, listed in a bibliography
Smith-Johnson Nonverbal Performance Scale (Smith & Johnson, 1977)	2-4 yrs.	Unspecified	FM, Cog	65/--[a]	Items scored individually, item category summary scores[b]	1584 normal and handicapped children	Test-retest, 602 normal children	Content, concurrent, 27 children	Reference for each item, some listed in manual, some in bibliography
Uniform Performance Assessment System (White, Edgar, & Haring, 1978)	0-6 yrs.	GM, FM/Pre-academic, Communication, Social/SH, Behavior Management	Lang (R&E)	314/163[a]	Summary score for each content area, overall summary score, developmental profile, rate of development, other computer generated[b]	- - -	- - -	- - -	- - -
C. Normal & Handicapped Population									
Behavioral Developmental Profile (Donahue, Montgomery, Keiser, Roecker, Smith, & Walden, 1975)	0-6 yrs.	Motor, Communication, Social	GM, FM, Lang (R&E), SH, PS	325/224	Summary score for each content area DQ score, developmental profile and age	- - -	- - -	- - -	General bibliography

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Test	Age Range	Content Areas (defined by test authors)	Clarification of Content Areas	Total Items/ Items 0-3 Years	Scoring	Standardization	Reliability	Validity: Content or Concurrent	Source of Items
Birth to Three Developmental Scale (Bangs & Dodson, 1979)	0-3 yrs.	Motor, Lang (R&E) Problem Solving, PS	GM, FM, SH	85/85^a	Summary score for each content area, developmental profile and age^b	357 normal children	Inter-observer 75 children	- - -	Surveyed literature & existing tests, general bibliography
Children's Early Education Developmental Inventory (Newborg, Wnek, Stock Schenck, & McFadden, Note 3)	0-8 yrs.	Motor, Communication, Cog, Adaptive, PS	GM, FM, Lang (R&E), SH, Perception	362/153^a	Summary score for each content area^b	From other tests	- - -	- - -	Surveyed literature & existing tests, reference for each item, listed in a bibliography
Gesell Developmental Schedules (Gesell & Amatruda, 1947^d)	1 mo-3 yrs.	Motor, Lang, Adaptive, PS	GM, FM, Lang (R&E) SH	374/366^a	Summary score for each content area, DQ score, developmental age^b	127 normal children	- - -	- - -	Some original items; no bibliography
Griffiths' Mental Development Scale, Griffiths (The Abilities of Babies, 1954)	0-2 yrs.	Locomotor, Eye/ Hand, Hearing/ Speech, Performance PS	Lang (R&E) SH	260/260^a	Summary score for each content area, IQ type score, developmental profile and age^b	604 normal children	Test-retest, 60 normal children	- - -	Surveyed literature & existing tests, some listed in manual, some original items, general bibliography
Griffiths' The Abilities of Young Children (1970)	0-8 yrs.	Locomotor, Eye/ Hand, Hearing/ Speech, Performance Practical Reasoning, PS	Lang (R&E), SH	430/270^a	Summary score for each content area, IQ type score, developmental profile and age^b	2260 normal children	Test-retest, 270 normal children	Concurrent, 524 normal children	Surveyed literature & existing tests, some original items, general bibliography, some from Griffiths' 1954

Test	Age Range	Content Areas (defined by test authors)	Clarification of Content Areas	Total Items/ Items 0-3 Years	Scoring	Standardization	Reliability	Validity: Content or Concurrent	Source of Items
Hawaii Early Learning Profile (Furuno, O'Reilly, Hasaka, Inatsuka, Allman, & Zeisloft, 1979)	0-3 yrs.	GM, FM, Lang (R&E), Cog, SH, PS		679/679[a]	Items scored individually, developmental profile[b]	From other tests	- - -	- - -	Surveyed literature & existing tests, listed in a bibliography
Kent Infant Development Scale (Reuter & Katoff, 1978)	0-1 yr.	Motor, Lang, Cog, SH, Social	GM, FM, Lang (R&E)	252/252	Summary score for each content area, developmental age, all caregiver report items	357 normal children	Test-retest, inter-observer, 38 children	Concurrent, 38 children	Surveyed literature & existing tests, general bibliography
Peabody Developmental Motor Scales (Folio & DuBose, 1974)	0-7 yrs.	GM, FM		276/192[a]	Summary score for each content area, overall summary score, developmental age[b]	- - -	- - -	- - -	Surveyed literature & existing tests, listed in bibliography
Rockford Infant Developmental Evaluation Scales (Project RHISE, Rockford, Illinois, 1979)	0-4 yrs.	GM, FM/Adaptive, Lang (R&E), PS/SH		308/279[a]	Items scored individually, developmental profile & level[b]	From other tests	- - -	- - -	Surveyed literature & existing tests, reference for each item, listed in a bibliography
Vulpe Assessment Battery (Vulpe, 1978)	0-6 yrs.	GM, FM, Lang (R&E), Cog, Daily Living, Basic Senses and Functions, Organizational Behaviors, (Assessment of Environment)	PS	1239/970[a]	Items scored individually, developmental profile and age	From other tests	- - -	- - -	Surveyed literature & existing tests, reference for each item, listed in a bibliography

Footnotes

[a] Description and procedure provided for each item.

[b] Explicit scoring criteria provided for each item.

[c] In their discussion of validity, the test authors included an additional 99 children for whom test scores were correlated with chronological age.

[d] Several versions of the Gesell Developmental Schedules have been published, each with somewhat different test items, age ranges, etc. Additional information may be obtained from these sources: Gesell, A., Halverson, H. M., Thompson, H., Ilg, F. L., Castner, B. M., Ames, L. B., & Amatruda, C. S., *The first five years of life*. New York: Harper & Bros., 1940; Knobloch, H., & Pasamanick, B. (Eds.), *Gesell and Amatruda's developmental diagnosis*, 3rd. ed. Hagerstown, Harper & Row, 1974; Knobloch, H., Stevens, F., & Malone, A. F., *Manual of developmental diagnosis*. New York: Harper & Row, 1980.

The Belief Systems of Infant Interveners (Munroe & Kopp)

As infant intervention programs have come into being, many individuals other than infant/child development specialists have been recruited to fill positions as administrators and interveners. No formal attempt has been made to determine the background, characteristics, beliefs, and professional needs of infant interveners. Since this information is essential to define the state-of-the-art of practice in the field, a preliminary study was initiated to provide information of this kind.

As a starting point, the conceptual perspective advanced by Yoshioka-Maxwell and Kopp (1978) was used. These authors suggested that "interveners" hold a system of beliefs about children in general, handicapped children in specific, the nature of development, contributors to learning, and goals of intervention. Yoshioka-Maxwell and Kopp further suggested that the sources of belief system stemmed primarily from (1) intuition and pragmatic knowledge defined by what worked and what did not work with any given child, (2) basic and applied research findings that have been reported in the psychological and educational research literature, and (3) ideas advanced by theorists (e.g., Piaget, Skinner, Erikson) about children and/or the nature of development.

In a brief review of pre-school intervention programs, Yoshioka-Maxwell and Kopp (1978) found evidence for all three sources of beliefs. Parenthetically, they noted that the most commonly referenced sources of beliefs derived from data and theory. However, these authors also thought that pragmatic/intuitive sources of knowledge, although widely ascribed to, would not appear in the professional literature. They suggested that writing about program operation was probably not a high priority for non-research, clinically-oriented interveners.

With this three-pronged conceptual perspective in mind, a short interview was developed that was designed to determine the beliefs interveners held about infants and intervention, and the kinds of knowledge bass they used to sustain their beliefs.

Thirty-five interveners who had direct contact with delayed children in the birth to three-year range participated in the study. Twenty of these were categorized as primarily "educational" (e.g., persons with degrees in education or persons acting as instructional assistants in the intervention program), while fifteen were categorized as "medical" (e.g., physical therapists, occupational therapists, nurses and speech pathologists). Subjects were recruited, via volleagues' contacts and word-of-mouth, from fifteen early intervention centers in and around Los Angeles which provide services to developmentally delayed children of varying etiologies.

A semi-structured interview was employed which focused on belief systems, sources of knowledge, ideas about parents, and intervention practices. In all, 30 questions were put to the subjects with probes utilized as necessary. Once the interviews were completed, they were transcribed and typed, and then coded and classified. The responses were subjected to item analyses.

For the sake of organization, the questions in the interview were grouped according to four arbitrary categories: a) general belief systems related to rationale for intervention and sources of knowledge, b) factors that contributed to interveners' work with handicapped infants, c) perceptions of parents and parents' involvement in programs, and d) current practices regarding intervention and treatment focus.

Answers to the interview questions were subjected to frequency counts, which were then converted to percentages. In the first set of analyses, standard score approximations to the binomial distribution were conducted on the most frequent response to each of the 30 questions. In the absence of a priori bases for prediction, responses were categorized into two dichotomous groups labeled common responses and different responses.

Four of nine questions pertained to interveners' beliefs about the practice of intervention and generated a common set of responses with a greater than chance expectation. With respect to source of knowledge vis-à-vis intervention, 68% of interveners noted that experience was a primary contributor. Other responses that were coded included colleagues, academic background and training, special courses, and maternal instinct. Sixty-three percent of the infant specialists described their beliefs concerning the effectiveness of intervention stemmed from observation and personal opinion; while a few noted that their beliefs derived from theory, data, or intuition. A large majority of interveners (77%) reported they thought the advantage of intervention was that it insured learning that would otherwise not take place; as a corollary, 74% described learning in infants was due to the external stimulation that was provided by objects and people.

Five questions pertained to the reasons interveners initially elected to work with handicapped infants, the factors that contributed to their continuing work, and their current needs apropos intervention. The only question that generated a common response pertained to the belief that working with handicapped infants was not a personal mission (63%). Though not significant, it is interesting to note that 57% of these infant specialists entered the field because of job availability, a majority of the others indicated they did so by choice.

With respect to parents, responses to four of the six questions occurred at greater than chance expectation. These included a strong belief that parent involvement in interventions was necessary (74%), and that it affected the whole family (71%) by providing a support system (66%). Of interest, 74% of interveners noted that they did not have a formalized program of parent involvement.

Ten questions were posed about the kinds of intervention currently being provided in programs. There was surprising unanimity in that seven questions generated significant common responses. Interveners described the child as the focus of activities most (60%) of the time. Generally, programs involved structured (80%), group activities (66%) administered in the context of a center setting (60%). The child's entry into the program was often perceived as abrupt, and interveners felt their programs did not take into account the difficulty of child separation from parents (66%). The actual orientation to intervention was noted to be developmental by 63% of the interverers, although others relied upon medical, rehabilitative, or educational perspectives. Finally, 66% of interveners described their method of evaluating program effectiveness by observing changes in parent behavior, although some examined child growth or child and parent growth.

The major background variable considered in the analysis was educational training and/or current work orientation of interveners since this was found to be the most prevalent differentiating characteristic among the interveners. Data were classified according to the responses given by educationally and medically oriented interveners. Analysis revealed that the former relied more heavily on experience with their own children as a source of information and skills than did the latter. Another finding indicated that medically-trained interveners were significantly more likely to make a conscious decision to work with handicapped children than educationally-trained interveners.

The findings of this study indicated that infant interveners had considerable agreement about the nature of intervention, and the role of parents. Moreover, the practices they reported showed more similarities than differences. Overall, slightly more than half of the reponses to the 30 questions showed higher agreement than would be expected by chance alone.

The findings of this study lend credence to at least one aspect of Yoshioka-Maxwell and Kopp's delineation of belief systems. That is, experience provides a major source of information and ideas for a sizeable number of interveners. However, it would be misleading to infer that all of the interveners represented in this study relied entirely on experience as the sole source of their beliefs as this was clearly not the case. Nonetheless, the responses that were given are thought provoking because the interveners as a group did not have extensive histories of working with infants.

It occurs to us that interveners might want to study more fully their resources and needs. Based upon this, they might establish and provide an extensive network of readily available training and information guides that could be drawn upon as needed. Itinerant educational programs and workshops, or even a small infant intervention journal might be mechanisms to consider.

A-2: Preschool Studies

Overview

Preschool research was carried out within five primary programs, each headed by a senior researcher who was a UCLA faculty member. Topics and major investigators were: Motivation-Stipek, Temperament-Keogh, Attribution-Keogh and Kornblau, Social-Chan, and Attention-Krupski. In a number of studies research activities were coordinated across programs so that investigators used common samples, shared descriptive data, and maximized use of research assistants' time. This cooperation was made formal in the collaborative work of Stipek, Keogh, and Chan, but occurred in a number of other instances. Preschool research activities were also tied to research in the Documentation of Progress and Support Systems areas of work. To illustrate, Krupski contributed importantly to the development of the observation system used by Burstein in the study of mainstream experiences of handicapped children (see Support Systems section in this report); and, Krupski, Burstein, and Keogh collaborated to use common data collection techniques in extending the preschool program studies. A summarizing narrative report, including major studies and findings, implications, and listings of publications and presentations, has been prepared for each program of research separately, synthesis across studies to be continued during the summer, 1982.

Motivation

(Stipek)

The motivation studies were predicated on the belief that the academic problems of handicapped children are exacerbated by motivational problems. The academic performance of mentally retarded children in particular is assumed to be the result of both motivational problems and cognitive deficiencies.

All of the studies supported by REACH concern the early emergence of motivational problems. We assume that although mildly mentally retarded children are not usually identified until about the second or third grade in school, their motivational problems begin long before this identification is made. We have employed three research strategies to examine the early development of motivational problems of mentally retarded and other handicapped children. First, taking the assumption that motivational problems develop in retarded children for the same reasons that they develop in non-retarded children, we studied children who represented the full distribution of ability levels. Second, most children who are ultimately labeled mentally retarded perform at a relatively low level in the first few grades of elementary school. By studying the development of motivational problems in very low-achievers we attempted to provide information on the emergence of motivational problems in mentally retarded children. Third, we compared teachers' interactions with retarded and otherwise handicapped children to their interactions with normal children. This was done to explore the possibility that preschool teachers compound motivational problems of handicapped children by communicating unnecessarily low standards of performance and encouraging helpless behavior.

The studies described below fall into two categories. The first set of studies are based on a cognitive model of motivation in which children's behavior in achievement settings is assumed to be mediated by their cognitions about achievement (e.g., their expectations for success and their perceptions of their own competence). In these studies, children were interviewed about their achievement-related cognitions. The second set of studies involved direct observations of children's behavior in standardized and natural achievement settings.

Cognitive Studies

The first study examined the criteria children use to judge competence (Stipek & Tannatt, 1982). These criteria are important to identify because any attempt to design an educational environment that enhances children's perceptions of their own competence requires an understanding of the information children use to judge competence. Ninety-six children, 4-8 years old, were given a standardized open-ended interview. The open-ended questioning method allowed us to examine developmental change in the criteria children of different ages spontaneously used in their judgments. Children were asked to explain how they knew who was best and worst in their class at various tasks and who was the best and worst thinker. They also rated themselves and their classmates on how smart each was and explained their ratings.

Several findings from this study have important educational implications. First, the preschool-aged children frequently referred to peers' social behavior or "likeability" in their explanations of their nominations or ratings. Apparently, for these younger children, social behavior is the most relevant dimension of evaluation. Indeed, the youngest children even explained their best and worst thinker nominations with this criterion! This suggests that children who have difficulty learning appropriate social behaviors may begin to develop negative self-perceptions which are later confused with their perceptions of their academic competencies. Chan's REACH research suggests that retarded children have more problems than nonretarded children on this social-behavioral dimension. If the social and academic competence dimensions are confused in young children's minds, as this interview study indicates, low perceptions of academic competence among retarded children may result, to some degree, from feedback related to their social competence rather than their intellectual abilities.

A second finding having educational implications was that children through the third grade frequently explained their nominations and ratings by referring to work habits. This finding is consistent with other research indicating that young children do not differentiate between effort and ability. This implies that feedback regarding work habits (which is plentiful in early elementary school classrooms) may be interpreted by the children as relevant to their ability. Teachers may need to provide this kind of feedback in ways that will minimize the potential negative effect on children's perceptions of their competence.

After reviewing the results of this study, which was done with a population of normally-achieving children, we decided to do an additional study comparing children who were doing poorly in school with those who were doing well (Stipek, 1981). The study had two purposes: First, to compare the criteria used by poor-achieving and high-achieving students and, second, to determine the grade level at which children's perceptions of their own abilities begins to reflect their relative academic performance in the classroom.

Very low and very high achievers in kindergarten through third grade were selected on the basis of teacher ratings of students' relative performance in school. Children were interviewed individually with the same standardized open-ended interview that was used in the Stipek and Tannatt study already reported. They rated their own and their classmates' "smartness," and were asked to explain their ratings. Only the self-ability ratings of the second and third graders reflected the teachers' rating of their achievement status and were correlated to classmates' ratings of their ability. At all grade levels children's ratings of each other reflected the academic status of the child being rated. Children most often gave examples of specific achievements to justify their ratings of their own ability. Peer evaluations were most often based on how well peers followed directions. There were no significant differences in the criteria used by the successful and nonsuccessful children.

The results of this study suggest that it may take a few years in an academic setting before children's perceptions of their own competence begin to reflect their actual performance in school, as assessed by their teachers. However, their ratings of peers may reflect the peers' actual performance as early as kindergarten and first grade. Children appear to be attending to and processing information regarding the performance level of other children as soon as they enter an academic setting. While their perception of their own competence apparently remains high until about the second grade, we know that they are able to process negative performance information much earlier. This suggests that we cannot assume that performance feedback given to children as early as kindergarten does not eventually influence their perceptions of competence.

A third cognitive study examined further young children's ability to use performance feedback. The results of this study are presented in Stipek and Hoffman (1980a); this study and a follow-up series of studies on children's expectations are also described in Stipek (in press b) and Stipek, Roberts, and Sanborn (1982a). In this study, we compared children's use of past performance information for judging self performance and performance of another child. In one testing session, 92 normal children aged 3-8 years were given one of three performance experiences on a motor task: consistent success, consistent failure, gradual improvement. During a second testing session, a series of drawings were shown depicting a child of the same sex who had the same performance outcomes as the subject. After receiving the performance feedback the subject was asked: 1) to predict the future performance of the actor (either the subject or the child depicted in the drawings); 2) to explain the cause of the past performance; and 3) to judge the amount of reward the actor should receive.

The results suggest that even preschool-age children use past-performance information and make performance-related judgments in an adult-like logical fashion, although the younger children usually did not discriminate between consistent failures and improving performance. The results suggest further that young children make greater use of outcome information in judging others than in judging themselves.

This study indicated that children in the early elementary grades used experimentally induced past performance information in their expectations for future success. This suggests that such information received in the regular educational setting might also influence children's expectations for success on tasks. Children who consistently do poorly in school may approach a new academic task with lower expectations for success than would children who enjoy consistent success in school. This possible influence of past performance history on future expectations is particularly important for mildly mentally retarded children. They are usually in normal classrooms during their first few years of elementary school and are very likely to perform relatively poorly. Their past failures may lead them to expect poor performance and consequently not to be motivated to try to complete tasks which they are, in fact, able to complete. Accordingly, a second study was designed to compare the expectations for success at a novel task of very low-achieving and high-achieving children (Stipek & Hoffman, 1980b). This second study also investigated whether attributions for performance outcomes mediated children's expectations for success at the task, i.e., did low-achieving children expect to do poorly because they believe they lacked the ability to do the novel task?

Forty high- and low-achieving girls and boys in the first and third grades were compared in terms of their expectations for success and their perceptions of the cause of failure on an academic-like task which was unfamiliar to them. Children individually were shown an anagram task and then asked how many of the ten sets of letters they expected to be able to solve. After failing at four unsolvable anagrams, they were asked to explain the cause of their failure by responding to six forced-choice attribution questions, including all possible combinations of four causal factors: ability, effort, task difficulty, and luck.

The results indicated that among boys in both grades and for first grade girls, children with a history of high academic success had higher expectations for success on the task than did children with a history of low academic success. In contrast, for the girls in third grade, the high achievers had lower expectations for success than did the low achievers. High-achieving boys were also less likely to attribute failure to lack of ability than were low-achieving boys. Further findings indicated that failure attributions to stable causes, particularly to lack of ability, were associated with lower expectations for future success. This result suggests that children's perceptions of the cause of past performance and their perceptions of competence mediated their expectations for future success.

These findings suggest that performance in school begins to affect children's expectations for success at a novel task in the early elementary grades. Therefore, the relatively poor performance that can be expected of mildly mentally retarded children in the regular first grade classrooms may result in over-generalized low perceptions of ability and unnecessarily low expectations for success. It is highly probable that these low expectations depress the mentally retarded child's academic performance.

These cognitive studies assumed that children's behavior in academic situations is mediated by their perceptions of their abilities, their expectations for success, and other cognitive variables. This cognitive model is difficult to apply, however, for purposes of identifying very young children with motivational problems. Results of the cognitive studies indicated that preschool-aged children have uniformly high expectations for their own success, even after consistent failure, and that kindergarten and first-grade children have high perceptions of their competence regardless of the teacher's assessment. Despite this apparent uniformity in achievement-related cognitions, casual observations of preschool-age children in task situations reveal tremendous differences in the way they approach tasks. To identify children in the preschool years who have motivational problems that may inhibit their learning we needed to examine directly their behavior in task situations. This was the focus of a series of studies carried out in three preschools in the Los Angeles area.

Observation Studies

In the first study we observed the behavior of 80 4-year-olds on a puzzle and a hidden-picture task (Stipek, in press a; Stipek, Roberts, & Sanborn, 1982a). The task-related behaviors assessed included: 1) task difficulty choice; 2) persistence on a difficult task; 3) effort (attention); 4) independence; and 5) approval seeking. One question this study was designed to address concerned consistency in children's task behavior across tasks and situations. A significant correlation was found between all but one behavior (attention) on the two tasks, indicating that individual differences in the way children approach achievement situations are not entirely dependent on the specific situation or the task.

A second study tested the "ecological validity" of this experimentally-based assessment of children's motivation (Stipek, Roberts, & Sanborn, 1982a). A rating scale was developed for teachers to rate these same 80 children's task behavior in the natural preschool setting. The teacher rating scale is comprised of 10 statements describing task-related behavior. There are two questions concerning each of the following five behaviors: 1) level of difficulty of task choice; 2) persistence on difficult task; 3) involvement; 4) dependence; and, 5) need for approval. Typical statements include the following: "Stays with task until it is finished, even if it is difficult;" "Seeks assistance from adults before attempting to do a task by her/himself." Teachers respond on a scale of 1 to 6 ("almost never" or "never" to "very often"), reflecting the frequency with which they observe each behavior in the child being described. Interrater reliability on the five subscales was modest (correlation coefficients for all 80 children ranging from .35 to .54, with an average of .45). For the most part, there was very little relationship between children's behavior in the standardized task situation and their behavior (rated by their teacher) in their natural preschool environment.

Forty-two of the children who participated in the two studies described above were retested in a follow-up study (Stipek, Roberts, & Sanborn, 1982a). These children were observed one year later in the same standardized situation. They worked on the hidden picture task used the previous year. Their teachers completed the same teacher-rating scale of the children's task behavior in the classroom.

There was virtually no consistency in children's behavior in the standardized task situation over the one-year period. However, teacher ratings for year one and year two were strongly correlated. A series of correlational analyses of the teacher ratings suggested that 4-year-old children's persistence, attention, dependence, and need for approval in natural school settings is relatively stable over a one-year period, if they remain in the same or similar educational context. The results suggested further that neither teachers' persistent biases about children nor teachers' influence over each others' perceptions could explain the positive and significant correlations found in ratings of children's behavior over time.

The results of this study provide some support for the assumption that there are meaningful differences in the task behavior children display in standardized experimental settings. However, the individual differences are not stable over time and are apparently unrelated to behavior in natural educational environments. This pattern of results certainly calls into question the use of observations in experimental settings for diagnostic purposes or for any other purpose which assumes that the behavior is stable over time or that it reflects behavior in the classroom. The greater stability in teachers' ratings of task behavior in the classroom suggests that maladaptive task behavior observed in a child as young as 4 years old may endure, as long as the child remains in a similar educational setting.

The final observation study compared teachers' interactions in task situations with three groups of preschool-aged children: 1) handicapped (including retarded, cerebral-palsied and hyperactive children); 2) high educational risk (identified by the teacher as underachievers, but with no formal handicapping label); and 3) normal. The handicapped and high-risk children were mainstreamed in two university-based preschool education programs. The observations were focused on teachers' responses to children's requests for help and attention, and on interactions teachers themselves initiated, including offers of assistance and task evaluation. We selected these particular behaviors because we were concerned that teachers may "over-assist" or provide gratuitous positive reinforcement to handicapped children.

Child-initiated behaviors were divided into five categories: 1) requests for help; 2) requests for approval; 3) miscellaneous task-related conversation; 4) non-task-related conversation or bids for attention; and 5) misbehavior. Sex and status (handicapped, high educational risk, and normal) differences were examined for each of these behaviors. Results indicated that high-risk children requested the approval of a teacher significantly more often than either the normal or handicapped children. On the average, a high-risk child requested some kind of approval about once an hour, compared to about once every two hours for the other two groups of children. High-risk and handicapped children misbehaved significantly more often than did normal children--about once every two hours, on the average, compared to about once every five hours for the normal children.

Teachers' responses to children did not vary as a function of the status of the child. When a child asked for approval, teachers most often either acknowledged them positively (e.g., just smiled) or explicitly made some positive evaluation of their task behavior or product. When children were observed misbehaving, teachers usually made some kind of a negative acknowledgement of the child's behavior. While handicapped children were no more likely to request approval than were normal children, and much less likely than high-risk children, teachers volunteered explicit positive feedback to handicapped children nearly three times as often as to normal children. High-risk children were given unsolicited positive feedback on their tasks about twice as often as were normal children. Teachers initiated interactions with high-risk and handicapped children about twice as often as with normal children (5 to 6 times per hour compared to 2½ times per hour). Most of these teacher-initiated interactions with the handicapped children were positive, either to offer information or to praise performance.

Overall, teachers tended to respond similarly to normal, handicapped, and high-risk children when the child initiated the interaction. However, teachers initiated interactions more frequently with handicapped and high-risk children. Most of these teacher-initiated interactions were for the purpose of providing information. However, note that providing unrequested information can be a means of interfering with the child's own task activities. Teachers were also more likely to offer explicit positive evaluations of tasks for these two special groups than for normal children.

To date, we can only speculate what affect the frequent praise and offers of assistance have on these young handicapped children's perceptions of their competence. If praise is taken at face value, it might have a positive affect. If the praise is perceived as gratuitous, it could undermine the handicapped children's self confidence. These are questions that must be addressed in future research. They are important, because what seems sensible and comes naturally to teachers who believe that they are providing the best possible educational experience for mainstreamed handicapped children may actually be harmful to the child's development.

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Temperament

(Keogh)

A primary goal in Project REACH research was delineation of the impact of individual differences in children's temperament on their interpersonal and educational competence. The study of temperament as an individual difference variable of importance receives support from both theoretical and clinical perspectives. Theoretically a strong case has been made by Bell and Sameroff for the bidirectional nature of child-adult interactions. Within this view the adult not only influences the child but is influenced by him. The child is not something to be acted upon but rather brings his own individual attributes to his relationships with others. From a clinical perspective, it is clear that handicapped children with similar cognitive and physical abilities have dramatically different interactions with their environment. Whether at home or in intervention programs, some children appear to get along easily and positively, to be involved with their environments in ways that maximize their potentials for development; other children with similar disabilities exhibit patterns of continuing stress, their incompatibilities with their environments seeming to confound or accentuate their limitations in other domains.

We suggest that individual differences in personal or behavioral styles influence, perhaps mediate, the interaction between child and environment. In any group of handicapped children we expect to see a broad range of personal styles. In our view these stylistic characteristics are captured by the temperament formulation proposed by Thomas and Chess.

Temperament refers to the characteristics and attributes proposed by Thomas, Chess, and Birch to describe behavioral style or the "how" of behavior. These investigators, based on their own clinical practices and on a continuing study of non-clinic children (New York Longitudinal Study [NYLS]), concluded that there are nine primary individual difference dimensions which define temperament: Activity Level, Adaptability, Approach/ Withdrawal, Threshold of Response, Intensity of Response, Quality of Mood, Distractibility, Persistence, and Rythmicity. These temperamental dimensions describe a range of individual differences which have been shown by Thomas and Chess to have some stability over time and across situations. As part of their program of work Thomas and Chess developed a 72-item questionnaire for use by parents (PTQ) and a 64-item questionnaire (TTQ) for use by teachers (Rythmicity is not included in the teachers' form). Based on their NYLS data Thomas et al. proposed that approximately two-thirds of the children in their sample could be characterized by three primary temperament constellations: Easy, Difficult, and Slow-to-Warm-Up. Stressing the dynamic nature of development, Thomas and Chess propose that within families temperament is a major contributor to "goodness of fit."

Project REACH researchers have extended the Thomas and Chess formulation to educational intervention programs, proposing that temperament also contributes to the goodness of fit between child and educational environment, especially to the interactions of child and teacher. Temperament studies within Project REACH have involved handicapped and nonhandicapped pre- and elementary-school children, parents, teachers, and teachers' aides. Methodological approaches included vignettes, ratings, and behavioral observations in intervention programs. Temperament findings have been linked to other REACH research efforts in the areas of teacher perceptions and attributions, social competence, motivation, and intervention implementation. Study of the impact of temperament over time has been addressed in the REACH longitudinal study. All studies have been carried out within the temperament framework proposed by Thomas and Chess and their colleagues. We wish to thank Drs. Thomas and Chess for their willingness to share their insights and findings and for their continuing interest and counsel to REACH researchers.

REACH Research on Temperament

As a beginning step in this program of research, theoretical and methodological problems important in the study of temperament were identified and reviewed in a major paper by Keogh and Pullis (1980). Definitional issues, questions pertaining to the number, organization, and stability of temperament dimensions, applications to young children and children at risk, and the relationship of temperament to other individual difference and developmental perspectives were discussed. In addition to synthesizing selected empirical findings on temperament, this paper pinpointed conceptual and technical problems requiring attention, e.g., consistency-stability, trait-setting influences, developmental continuities-discontinuities, normative-ipsative approaches, and measurement limitations.

The Keogh and Pullis paper provided a "state of the art" description of temperament relative to young handicapped children, and was the basis for generating the three major hypotheses which directed subsequent REACH research (Keogh, 1982a): (1) There are real and relatively stable individual differences among children in their temperament patterns; (2) These individual differences among children are perceived by adults and peers who interact with them, and influence the nature of interpersonal interactions; (3) Perceived variations in temperament are especially powerful influences on adults' perceptions and decisions when children have some handicap in cognitive or physical development. Said directly, we hypothesize that the impact of temperament increases with the severity of handicap.

Building from these hypotheses, we have studied the impact of temperament on children's adjustment and performance in school in a series of related studies. Measurement problems were addressed first. We then moved to test our major hypotheses in two lines of research. In the first we attempted to delineate the link between children's temperament and teachers' perceptions and decisions. In the second we focused on the influence of temperament on children's personal-social competence within interventions. Both handicapped and nonhandicapped children were included in both lines of research.

Measurement

A number of investigators have developed techniques to assess temperament variations in infants and young children (see the 1981 Child Development review and discussion of infant scales by Rothbart, as example). The original scaling work by Thomas et al. was carried out on a selected sample of children and families in New York City. Subsequent scale deveopment by William Carey and and his associates has focused on assessment of temperament within a pediatric context and has led to longer scales for use by parents. However, consideration of temperament within an educational context required a scale which was psychometrically adequate yet practically feasible for use by teachers. As a first step in REACH work we focused on the 64-item TTQ developed by Thomas & Chess. Our goals were to assess reliabilities of items and dimensions, to determine the extent of agreement among raters, to identify the factor structure, and to assess the influence of sex and age of children on raters' perceptions.

Teacher Temperament Questionnaire (TTQ). Analysis of the TTQ was based on data from 35 teachers in three preschools in the Los Angeles area (Keogh, Pullis & Cadwell, 1979). The sample consisted of over 300 3-6 year old children. All children were rated by at least two teachers. Analyses were performed first at the item level; scores were then weighted and summed, providing a single score for each of the eight dimensions. Correlations between the two teachers' ratings (dimension scores) ranged from .19 to .84, mean correlation = .59. Rate-rerate correlations over a five-week period for a subset of teachers ranged from .69 to .88, mean r = .81. Internal consistency reliability coefficients for dimensions ranged from .46 to .85.

Separate factors analyses of the 64 items and of the eight dimension scores yielded a similar three-factor structure. The first factor was composed of the dimensions of Persistence, Distractibility, and Activity Level. We interpret this as a task related factor. The second factor, made up of

Adaptability, Approach-Withdrawal, and positive Mood, appeared related to the child's flexibility, especially in social situations. The third factor, labeled Reactivity, was composed of dimensions of Intensity of Response and Threshold of Response; items concerned with the negative aspects of Mood also appeared in this factor. Further analyses confirmed past findings and intuitive notions concerning sex and age differences: Boys were rated higher than girls in Activity, Intensity, and Distractibility, but lower in Persistence; as age increased there was a general increase in Persistence accompanied by a decrease in Distractibility.

Having established the three-factor structure of the Thomas and Chess TTQ, the original scale was revised by examining the factor loadings for the 64 items and retaining only those items with substantial weightings. This process yielded a 23-item scale in which all eight dimensions were represented (see Appendix). In this form of the TTQ the teacher is asked to rate each item on a 6-point scale from "hardly ever" to "almost always." Psychometric properties of the scale were examined by Pullis (1979) and Cadwell and Pullis (1982) who gathered new data on over 300 children in kindergarten, first, and third grades. Pullis verified that the factor structure of the short form was consistent with that of the original 64-item scale, the 23 items clustering into three factors labeled Task Orientation, Personal-Social Flexibility, and Reactivity. When the items were grouped according to the factor structure and tested for internal consistency, alpha coefficients for the three factors were .94, .88, and .62, respectively. Examination of sex and grade differences yielded findings consistent with those of the psychometric analysis of the long form of the TTQ already discussed. Detailed discussion of the factorial invariance of the short TTQ may be found in the report by Cadwell and Pullis (1981).

Taken as a whole, results of the psychometric analyses of the Teacher Temperament Questionnaire suggest that the 23-item short form is a reliable technique for assessing teachers' perceptions of children's temperament. The two forms are factorially consistent; the factors have demonstrated internal consistency; agreement among raters is acceptably high; and the scores are consistent with expectancies for age and sex of children. On a practical level teachers are able to use the scale efficiently and quickly. The psychometric studies and suggested short form of the TTQ have been written up (Keogh, Pullis, & Cadwell, 1982), the article in press. The 23-item short form TTQ has been the major technique used to assess children's temperament in subsequent REACH studies.

Parent Temperament Questionnaire (PTQ). Psychometric study of the Parent Temperament Questionnaire involved procedures similar to those with the TTQ, but analyses were limited because the sample size was smaller. Parent data were collected on 128 children from two preschools. The 72-item Thomas and Chess PTQ was distributed by the schools and returned to UCLA by mail. 126 responses were received from mothers, 70 from fathers. Reliability coefficients for the Parent subscale ratings (dimensions) were generally lower than those for the TTQ, ranging from .16 to .75 for mothers, .39 to .62 for fathers. Parent agreement was, in general, high (8 subscale correlations significant at the .001 level). The range of values of r for mother-father agreement was .25 to .73, the mean correlation = .58.

Factor analysis of the mothers' ratings was carried out on dimension scores. Comparable analysis of fathers' scores was not possible because of missing data. The first factor was similar to the teacher factor related to interpersonal skills, being composed of Adaptability and Approach/Withdrawal, and positive Mood. The second factor appeared related primarily to Intensity. The final factor tapped Mood. These factors accounted for less of the variance than did the teacher factors, Factor 1 = 28.8%, Factor 2 = 13.7%, Factor 3 = 12.3%. The Persistence-Distractibility factor that was important for the teachers did not appear so clearly in the factor findings for maternal ratings. This may reflect the relative importance of these aspects of behavior at home or in school.

Correlations between mothers' and teachers' ratings as well as between fathers' and teachers' were low (range of r was -.09 to .52 for mothers and teachers, -.03 to .34 for fathers and teachers). This may be taken as an indication that teachers and parents perceived the children differently, or that the scales were situationally sensitive. Parents and teachers interact with children in different settings, so different aspects of behavior (and/or temperament) may vary in importance. Finally, parents' ratings of their children's temperament confirmed expected differences: (1) Boys were rated as more Active than girls; (2) Boys were rated as more Intense in their responding than were girls; (3) Boys were rated as more Distractible than girls, but there was a decrease in distractibility as age increased; (4) Girls were rated as more Persistent than boys, and there was an increase in ratings as age increased; and (5) Older children were rated higher than younger children on Rythmicity.

On the basis of these analyses a short form of the PTQ was defined (Keogh, Pullis, & Cadwell, 1979). This scale consists of 23 of the original 72 items, representing eight dimensions (Rythmicity not included). This scale has been found to be feasible for use by parents, to be scorable within the Thomas and Chess system, and to allow identification of subjects according to the Thomas et al. Easy, Difficult, and Slow-to-Warm-Up groupings. As the factor structure was less definitive than that for the TTQ, the dimension scores have been the basis for analysis in subsequent REACH longitudinal preschool work.

Children's Temperament and Teachers' Decisions

Our work on the impact of children's temperament on teacher decisions drew from decision theory as proposed by Shavelson and from the accumulating literature on teacher expectancy. The work of Brophy and his associates also provided important insights and direction, as these investigators have demonstrated that teachers' instructional and classroom behaviors toward individual children are determined, in part, by the perceptions and expectations they hold about them. Our research was carried out with the notion that childrens' temperament is a powerful influence on teachers' perceptions, and, thus, on their behavior.

Based on this model, in two vignette studies we systematically manipulated the nature of the informational cues, characteristics of subjects, and specific educational decisions in order to test a series of hypotheses about temperament and teachers' decisions (Keogh, Yoshioka-Maxwell, Cadwell, Wilcoxen, & Wright, 1982). The vignette methodology has been shown to yield reliable and interpretable data; it provides a relatively direct way of determining the influence of particular kinds of information on teachers' decisions. Child information incorporated into the vignette profiles included sex, ability, temperament patterns, and handicapping conditions. In the first part of this study hypothesized pupils were identified as boys or girls and as normally developing or developmentally delayed. Their temperament profiles were varied so that all possible combinations of temeperament factors were represented. Scores on the three primary temperament factors (Task Orientation, Flexibility, and Reactivity) were presented graphically so that every temperament profile appeared in every boy/girl, normal/handicapped pairing. Over 175 teachers read profiles and made decisions about each hypothetical child in terms of readiness for kindergarten, likelihood of need for special services, and expectations of management problems in the classroom. In the second part of the study, we tested directly the influence of degree and kind of handicap on teachers' decisions by presenting teachers with descriptions of hypothetical boys, some of whom were described as hearing impaired, others as physically impaired. Handicapping conditions were selected because of their relative visibility. In addition to type of handicap, the severity of handicapping conditions (mild or moderate) was described.

Findings suggested that teachers used an additive model of decision making in which ability and temperament were significant contributors. There was no significant effect for sex of child. Task Orientation was the dominant influence on teachers' decisions about supervision, motivation, teachability, readiness, potential, and special needs. Flexibility and Reactivity were dominant influences in the sociability domain. The information about severity of handicap played a strong role in the perceived need for special education services. Taken as a whole, these findings allow the interpretation that children with negative temperament patterns are viewed as requiring more and specialized teacher supervision and direction, suggesting that they are perceived as potential problems in the classroom. Handicapped children with negative temperament patterns were likely to elicit referral for special services. Severity of handicap, rather than type of handicap, was associated with temperament in influencing teachers' decisions. While the type of temperament information (Task Orientation, Reactivity, Flexibility) was differentially important, the impact of Task Orientation appeared most potent.

Using the same basic decision model, the impact of temperament on teachers' decisions in actual classrooms was tested in a series of studies. Pullis (1979) examined relationships between children's temperament, other pupil attributes, and teachers' decisions about classroom management and placement recommendations. One goal in this work was to determine if individual differences in temperament were associated with children's actual ability, their achievement in school subjects, and their behavioral adaptability. A second goal was to determine if perceived child characteristics influenced teachers' classroom decisions about instructional strategies, referral for psychological services, and expectations for future performance. Thirteen primary grade teachers rated over 300 children on the 23-item temperament questionnaire and also provided estimates of children's ability, expectations for performance, and management and instructional information. The latter decisions focused on management strategies in five typical classroom situations: individual seatwork, group activity, transitional periods, and the like. Objective information about children, provided by the school district, included IQ, achievement test results, and grades from previous school years.

Pullis found that the three temperament factors, particularly Task Behavior, were significant influences on teachers' classroom decisions, but had little influence on placement recommendations. The relationships between teachers' ratings of temperament and children's IQ, achievement scores, and grades, were significant. However, after controlling for the effect of IQ, Task Behavior and Flexibility were found to relate significantly to teachers' estimates of pupils' ability, children with more positive temperament patterns being rated higher than those with less positive characteristics. Relative to test determined IQ, teachers overestimated the ability of children with positive temperament characteristics. These findings support relationships between children's temperament and their achievement and adjustment in school. In specific, teachers' ratings of children's temperament were significantly related to other measures of children's academic performance, to teachers' perceptions of other aspects of children's school behavior, and to teachers' classroom management decisions. On the basis of these findings, we infer that teachers' responses to children in classroom situations are mediated by their perceptions of the children's temperamental characteristics. More detailed discussion of this work may be found in Pullis (1979), Pullis and Cadwell (1982), and Keogh (1982a). The interpretations received further support from followup work with the same sample (Pullis, 1981), and from subsequent research with learning disabled pupils in mainstream and special education placements (Pullis, 1982).

The impact of children's temperament on teachers' perceptions was tested further in a series of studies with normally developing and handicapped preschool children and with learning disabled pupils. Keogh (1982a) and Keogh and Kornblau (1981) assessed temperament and perceived teachability of 82 four year old children enrolled in three preschool or day care centers in the Los Angeles area. Although only a few children had identified handicapping conditions, the sample contained a number of children "at risk" for school success according to demographic variables. Teachers rated all sample children using the short form of the TTQ. Teachers also rated children as to their "teachability," using a global 1-8 scale as well as the Kornblau 33-item Teachable Pupil Survey.

Girls were rated higher than boys on Task Orientation; mean values were lowest for the school serving children from the least advantaged socioeconomic backgrounds. No significant sex differences were found on the other temperament factor scores, but Flexibility differed according to school, a similar pattern as shown for Factor One. Teachability scores on the three dimensions of the Kornblau Survey (Cognition-Motivation, School Appropriate Behaviors, and Personal-Social Characteristics) did not differ significantly for boys and girls. However, girls were rated higher than boys on the global teachability scale. Differences by schools were nonsignificant except for School Appropriate Behaviors where there were higher ratings for children from more advantaged socioeconomic (SES) backgrounds. Sex groups did not differ in IQ or in SES; temperament was not significantly related to IQ or to SES.

Followup of 43 children still in the same preschools (Keogh, 1982c) yielded similar findings. Taken as a whole, there was clear evidence that children's temperamental characteristics influenced teachers' perceptions of their competence and of their teachability. These findings, coupled with the results of the classroom observation studies (see Support System section of this report) which demonstrate that teachers interact differently with children with different temperament patterns, argues for consideration of temperament as an individual difference variable of importance in educational programs. The impact of temperament on teachers' perceptions and expectations receive further support from Keogh and Kornblau's (1982) study of over 40 teachers and 400 pupils, these data currently being written up for publication. In essence, the findings document patterns of temperamental differences for pupils who are similar or discrepant from the teachers' views of model pupils.

Evidence supporting the impact of temperament within special education programs was generated in a study of 38 elementary age pupils enrolled in a special school for children with learning disorders (Keogh, 1982b, d). Agreement between teachers rating the same children on the 23-item Temperament scale was high. In addition to temperament ratings, teachers were asked for their perceptions of pupils' teachability using the Kornblau Survey and the global 1-8 scale. Temperament scores were independent of tested IQ. Temperament factors of Task Orientation and Flexibility were major contributors to teachers' views of pupils' teachability. Seven of nine correlations between the temperament factors and the Kornblau teachability dimensions were significant. When pupil characteristics of IQ, sex, and the three temperament factors were regressed on to the global teachability scores, 61% of the variance was accounted for, temperament factors of Task Orientation and Flexibility accounting for 50%. IQ contributed less than 1%. Clearly temperament was an influence on teachers' perceptions of pupils' teachability within this special education group.

In the spring of the year, one of the school administrators reviewed each child's record and categorized the amount of progress made over the school year. Progress was defined in terms of academic, social, and behavioral change, the values for each category summed to provide a total progress score. The relationships between temperament Task Orientation and the four progress scores were .43, .51, .55, and .57, respectively. Comparable relationships for the temperament factor of Reactivity were: .49, .54, .62, and .63, respectively. Relationships between the temperament Personal-Social Flexibility factor and the progress ratings were modest and nonsignificant, although the value of $\underline{r}$ (.30) between this factor and progress in the social area was higher than for the progress in either behavior or academics. Taken as a whole, the strength and pattern of findings from this group of young learning disabled pupils provides evidence in support of the impact of temperament on children's school adjustment and achievement. These findings, demonstrating the impact of learning disabled pupils' temperament on teachers' perceptions and decisions, were confirmed and extended by Pullis (1982) in a study of over 400 learning disabled pupils in both regular and mainstream classes. In this work Pullis provided direct evidence of the impact of pupils' temperament on both management and instructional decisions.

The contribution of temperament to children's social competence is under investigation in a collaborative study with REACH investigators Chan and Stipek. All data have been collected and analyzed and final reports and publications are in preparation. Findings to date confirm the importance of temperament as a personal attribution of importance in the social interactions. This line of research will be extended in subsequent research focused on the development of personal competence, currently in the planning stage (Keogh & Stipek).

In summary, REACH research on temperament suggests that individual differences in children's temperament are important contributors to success in school. Using our measurement system, it is possible to describe children's temperament patterns with some reliability. These variations in patterns are clear contributors to teachers' views of pupils' teachability, the estimates they make of pupils' abilities, the kinds of expectations they have for pupils' educational performance, and the amount and kind of interaction they have with them. Recognition of stylistic differences in children's behavior is important for parents and teachers as these variations are the basis of many instructional and management decisions. Teachers who have participated in our research report that viewing children within the temperament frame of reference has made them more sensitive to their own perceptions of individual children. The temperament dimensions apparently provide a differentiated framework for viewing children. Recognition of temperament patterns is particularly helpful in anticipating problem situations. Apparently recognition of temperamental individuality allows teachers to modify their own behavior in order to get a better approximation of the "goodness of fit" suggested by Thomas and Chess in their work with clinical populations. Specific publications and presentations may be found in Section VII of this report.

Cadwell, J., & Pullis, M. E. Assessing changes in the meaning of behavior: The factorial invariance of temperament across grades. Paper presented at the annual meeting of the AERA, Los Angeles, April 1981. Submitted for publication, 1982.

Keogh, B. K. Children's temperament and teachers' decisions. In M. Rutter (Ed.), Temperamental differences in infants and young children. London: The Ciba Foundation, 1982, in press. (a)

Keogh, B. K. Individual differences in temperament: A contributor to the personal-social and educational competence of learning disabled pupils. In J. D. McKinney & L. Feagens (Eds.), Current topics in learning disabilities. New Jersey: Ablex, 1982, in press. (b)

Keogh, B. K. Temperament in preschool children: Personal-social and education competence: A two-year study. Manuscript in review, 1982. (c)

Keogh, B. K. Temperament as an influence on learning disabled children's personal and educational competence. In review, Journal of learning disabilities. Manuscript in review, 1982. (d)

Keogh, B. K. Temperament: An individual difference variable of importance in intervention programs with preschool handicapped children. Topics in Early Childhood Special Education. In press, 1982. (e)

Keogh, B. K., & Kornblau, B. Temperament and teachability in preschool children. REACH report, UCLA, 1981.

Keogh, B. K., & Kornblau, B. Children's attributes and teachers expectations: Matched or discrepant? Manuscript in progress, 1982.

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Keogh, B. K., Pullis, M. E., & Cadwell, J. Psychometric analysis of the Teacher Temperament Questionnaire. REACH report, UCLA, 1979.

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Keogh, B. K., Yoshioka-Maxwell, B., Cadwell, J., Wilcoxen, A. G., & Wright, B. The impact of pupils' temperament on teachers' decisions: A vignette study. Manuscript in preparation, 1982.

Pullis, M. E., & Cadwell, J. The influence of children's temperament characteristics on teachers' decision strategies. American Journal of Educational Research, 1982, 19(2), 165-181.

Pullis, M. E. An investigation of the relationship between children's temperament and school adjustment. Doctoral Dissertation, University of California, Los Angeles, 1979.

Pullis, M. The role of non-intellectual factors in the assessment and determination of school risk. Presented at the annual meeting of the AERA, Los Angeles, 1981.

Pullis, M. E. Temperament characteristics of LD students and their impact on teachers' decisions: A view from both sides of the mainstream. Paper presented at the annual meeting of the AERA, New York, March 1982.

Attribution

(Keogh, Kornblau, & Ballard-Campbell)

A major hypothesis underlying REACH attribution research was that adults' attributions about children's behavior influence the nature of their interactions with them. Our work has drawn on attribution theory as proposed by Bernard Weiner, and relies also on the teacher expectancy and attitude research of Brophy, Good, Evertson and their colleagues. The attribution research within REACH has been closely tied to a series of studies of children's temperament (see Temperament section of this report). We have been particularly concerned with how temperament variations contribute to parents' and teachers' perceptions of children; and, at how these perceptions may lead to different expectations and attributions about children's behavior. Attribution studies have been conducted in two major lines of work: Teachers' perceptions, including the development of appropriate and feasible measurement techniques; and, parents' attributions. Subjects have included regular and special education teachers and aides across grade levels preschool - grade eight; parents of handicapped and nonhandicapped children; preschool and elementary special and regular education pupils.

The conceptual background for REACH attribution research was laid out in two papers, one dealing with teachers (Kornblau & Keogh, 1980) and one with parents (Lavelle & Keogh, 1980). In these papers theory and evidence relating to adults' perceptions and attitudes were synthesized and interpreted, and possible implications for special educators suggested. The papers provided background information and direction for empirical studies of teachability and attribution summarized below.

Teachability Studies (Kornblau & Keogh)

Teachability refers to teachers' views of pupils' likelihood for success in school programs. It subsumes cognitive and personal-social characteristics, appearing to tap amenability to instruction, ease and adequacy of interpersonal relations, motivation, and personal style. Despite lack of precision of definition, teachers have little difficulty dealing with the concept and are in strong agreement as to where pupils fall on a teachability distribution. Using a paired comparison technique in which every child was paired with every other child, Maddox-McGinty (1978) found that 4 teachers working with the same 40 children made similar decisions about who in each pair was more teachable. The technique yielded a numeric distribution of first place votes, the range 9-289. Other teachability assessment techniques such as a quartile sorting (Kornblau, 1979) and a 1-8 global rating have also been found to yield high agreement among teacher raters and, importantly, to be consistent with results of the more time consuming paired-comparisons method (Keogh & Kornblau, 1980). On the basis of these data we have concluded that teachers are reliably able to assess children's teachability.

In an effort to operationalize the teachability construct and to provide more differentiated information, Kornblau (1979, 1982) developed the Teachable Pupil Attribute Scale. The scale consists of 33 items which are represented in three factors: cognitive-motivational characteristics; school appropriate behaviors; personal-social characteristics. All attributes were generated by teachers who were asked to identify characteristics of ideal or model pupils. Teachers from preschool through junior high school and from regular and special education programs were included in the scale development. The teacher-generated teachability atttibutes were submitted to a multidimensional scaling technique and then Likert scaled. The weighting of some items was found to vary slightly according to grade level and according to individual teacher, but overall the strength of agreement as to what constitutes characteristics of teachable pupils was striking. The scale has been found to be reliable in terms of rate/re-rate and teacher agreement. Kornblau has devised two forms of the scale, one used to define teachers' views of "model" or "ideal" pupils, a second used to describe actual pupils in classrooms (see Appendix). The scale has been used with teachers from preschool through junior high school. It has been shown to have factorial stability although weighting of items varies somewhat according to grade level of teacher and child (Kornblau, 1979).

In a series of studies (see Kornblau & Keogh, 1980, for review) we have demonstrated that teachers have a priori views about the attributes of model pupils. We have also shown that pupils whose characteristics are similar to the a priori model are viewed as highly teachable but that pupils are viewed as less teachable as they are discrepant from the model. In a recently completed study (Keogh & Kornblau, 1982) over 40 teachers each rated ten-fifteen pupils on a 1-8 global teachability scale and on the differentiated 33-item Teachable Pupil Attribute Scale. Teachers also completed a 33-item ideal or model pupil scale. Comparison of the dimensional scores on the ideal and actual pupil ratings yielded a discrepancy distribution (range 19-38). The discrepancy scores were found to be significantly but inversely related to the teachers' overall ratings of children's teachability (r = -.55). Children viewed as less teachable were characterized by negative temperament patterns, although not necessarily by low IQ or academic deficiencies.

Further support for the teachability notion comes from studies of preschool children and special education pupils. In work carried out in three preschools in southern California, Keogh and Kornblau (1981) gathered teachability and temperament ratings on 82 four and five year old children. Independent measures were taken of the children's cognitive ability, their readiness for school, their motivational characteristics, and their interactions with peers, the latter data gathered through classroom observations. Teachers' ratings of children's teachability were significantly related to children's social class and to IQ. Eight of nine relationships between the 3 teachability dimensions and the 3 temperament factors reached statistical significance, temperament factor 1 (Task Orientation) having the highest relationship with the overall teachability rate (r = .61). Regressing the various child characteristics (three temperament factors, IQ, sex, ethnicity, SES) against the overall teachability ratings accounted for 17% of the variance. Temperament factor 1 (Task Orientation) made the largest single contribution (13%). IQ and temperament factor 2 contributed only an additional 3%. Clearly teachability is a complex perception which is not synonymous with intelligence. The results were replicated in a second year followup as part of collaborative work with REACH investigators Chan and Stipek; second year findings showed even more powerful contributions of temperament to teachability (Keogh, 1982c).

In related work, teachability was studied within a group of 38 learning disabled pupils attending a full day special school in southern California (Keogh, 1982b). In addition to objective IQ and achievement data, teachers provided global and detailed ratings of pupils' teachability and rated them on the 23-item temperament scale developed by Keogh, Pullis, and Cadwell (1982). The mean value for temperament factor one, Task Orientation, was lower than the mean for the other two factors, a pattern conceptually consistent with most definitions of learning disabilities. Teachers also rated these learning disabled pupils lowest on items making up the teachability dimension tapping school appropriate behaviors. The temperament factors of Task Orientation and Flexibility were significantly related to the overall global rating of teachability, values of r .48 and .53, respectively; factor 3, Reactivity, approached statistical significance, r = .39. The three teachability dimensions, cognition, school appropriate behavior, and personal-social characteristics, were all significantly related to the global teachability score, values of r .43, .55, and .62, respectively. The highest single correlation was obtained between the temperament factor of Task Orientation and the teachability dimension of school appropriate behavior, r = .75. Apparently ability to modulate activity, to attend to task, and to withstand distraction are highly valued behaviors within the learning disabilities classroom. Children who were perceived as strong in these characteristics were also rated as teachable, a finding consistent with the voluminous literature on teacher expectation and behavior carried out predominantly with normally achieving children.

IQ, sex, and the three temperament factors were regressed against the global teachability ratings, accounting for 61% of the variance. The order and weighting of the variable contributions are to be noted: Temperament Factor One (Task Orientation) .256; Temperament factor two (Flexibility) .248; IQ .062; Sex .026; Temperament factor three (Reactivity) less than 1%.

Taken as a whole, the data suggest that within groups of children with serious learning and behavioral problems there are individual difference characteristics of importance in the teacher-child interaction. Our findings document differences in teachers' perceptions of children's teachability and provide some suggestion as to the basis of these perceptions.

Finally, using data gathered through systematic in situ observations of handicapped children in preschools (Burstein, 1982; Krupski & Burstein, 1982), we have tentatively identified a relationship between teachers' perceptions of children's teachability and the nature of their interactions with them. This work will be completed during the summer of 1982.

To date, our data are consistent in showing that teachability ratings vary within any group of children. Using the Kornblau (1979, 1982) teachability scales, teachers within both special and regular education programs are able to make reliable and consensual differentiations about children's teachability. These findings suggest that teachers' perceptions are built up from a variety of child attributes representing a number of aspects of children's personal competence. Temperament or behavioral style describes one set of attributes. Importantly for the implementation of intervention programs, teachers' perceptions and expectations become translated into their behaviors with individual children. Our behavioral data support the truism that life in the classroom is not the same for all children. Perceived teachability appears to be one of the mediators of the teacher-child interaction. Findings from this line of research add support to the decision making model of teaching proposed by Shavelson and to the literature on teacher expectancy generated by Brophy and associates. More importantly, from an applied perspective recognition of the interactions of children's attributes, teachers' perceptions, and teachers' instructional and management decisions may provide teachers with more powerful insights into their own relationships with pupils, especially those with possibly disabling or handicapping conditions.

Parent-Teacher Attribution Studies (Ballard-Campbell & Keogh)

As with the teacher attribution research, the theoretical basis for the present work was provided by the attributional model of Weiner. The immediate background for the study of parents' attributions was research conducted at UCLA by Lavelle (1977) and the review of parents' perceptions by Lavelle and Keogh (1981). In Lavelle's 1977 work the casual attributions of parents of normally achieving, mentally retarded, and educationally handicapped elementary age children were examined relative to two kinds of school tasks and three kinds of outcome information (success, failure, ambiguous). Differences in parents' attributions and expectations according to child characteristics were clear, suggesting that parents interpreted similar performance on the part of their children differently, depending upon the handicapped/non-handicapped status of the child. As example, parents of educationally handicapped children attributed both success and failure to effort, while parents of mentally retarded children attributed their children's successes to luck, their failures to ability.

The demonstrated importance of attributions on adults' subsequent expectations and behavior toward individual school aged children provided the impetus for study of attributional patterns of adults toward handicapped and non-handicapped preschoolers. Extending the earlier research with older children, the purpose in Ballard-Campbell's work was to provide an analysis of the effects of a handicapping condition on adults' perceptions of young children's competence. Specifically, she focused on parents' and teachers' perceptions of academic and social functioning of preschool handicapped and normal children. Several questions were addressed. The first four directly examined the nature of attributions as influenced by child characteristics (handicapping condition), situation (school learning, social), outcome (success, failures), and rater (parent, teacher). The last three examined the relationship of attributions about locus, stability, and controllability to attitudes affecting adults' educational decisions. The underlying assumption was that adults' perceptions of the causes of children's behavior influence their educational goals for the child, their interactions with them, and their decisions about the appropriateness of various educational placements. The relationship of specific dimensions of perception to attitudes which may affect delivery of educational services to handicapped children was also addressed.

Subjects were a parent and a teacher for each identified handicapped and non-handicapped child. Parents and teachers of sixty normally developing, physically handicapped, and mentally retarded 3-5 year old children from 25 schools and centers participated in this study. Children were drawn from self-contained handicapped and mainstream preschool programs. Both teachers and parents were asked to complete a 32-item questionnaire directed at several aspects of each sample child's functioning in academic and social situations at school. Specifically, each child was rated by parent and teacher on general ability, motivation, sociability, and physical appearance. Another set of questions related to adults' perceptions about the success or lack of success of the child in terms of school learning and social adequacy. The situations were presented in vignette fashion. Adults were asked to specify their expectations about the child's probable success or lack of success on each specific task and to make attributions about the causes of successful or unsuccessful performance. A final set of questions focused on adults' educational views of the children's school placement needs, their expectancies for the children's future success, and their willingness to work individually with the children on specific school related problems.

Final analyses are in progress, the complete report to be submitted for publication in summer, 1982. Initial analyses indicate that parents and teachers of normal preschoolers viewed the children in a consistent and similar manner. For retarded children both parents and teachers viewed behavior related to school learning tasks as unstable and not controllable. There were differences in attributions about locus, however; parents perceived behavior as internally controlled, teachers perceived behavior as externally controlled. For physically handicapped youngsters, both parents and teachers viewed school learning behavior and performance as under the child's volitional control, but unstable. For both groups of handicapped youngsters, as well as for normally developing children, parents and teachers agreed that school social behavior was caused by variables which are stable, internal, and controllable by the child.

Related to expectations for success, parents of physically handicapped children had higher expectations than did teachers for the children's success on specific academic and social tasks. Parents viewed their children as ready for placement in a mainstream setting while teachers perceived a need for a more controlled environment. For the retarded children, teachers expected more success on specific academic tasks than did parents, but parents and teachers agreed that a special class or special school was the best placement for their children. Parents and teachers of retarded children agreed on their expectations for social behavior.

Preliminary comparisons across raters yielded findings which suggest that while normal children were perceived as more successful than either group of handicapped children on general school learning tasks, there were no differences in perceived successful social behavior among the three groups of children. However, when asked to give expectations for success on specific school learning tasks (following directions, focusing attention) retarded children were seen as least likely to succeed, normals as most likely to succeed. For specific school social tasks (cooperating, sharing) normally developing children were expected to be more successful than either retarded or physically handicapped children.

Taken as a whole, then, data generated in Ballard-Campbell's research identify a number of consistencies between parents' and teachers' attributions about handicapped and non-handicapped children, at the same time pinpointing some important areas of difference. It may well be that differences in attributions lead to disagreement, even conflicts between parents and teachers as to the appropriateness of particular educational placements or instructional programs. As parents and teachers together provide the major source of educational planning and decision making for handicapped children, the importance of recognizing the attributional differences seems obvious. Where attributional interpretations are consistent between parent and teacher the educational consequences may be more easily accomplished. That is, parents and teachers may correctly perceive differences among children, and appropriately individualize their efforts based on these perceptions of children's characteristics and task or situation requirements. The influence of perceptions on adults' behavior may not necessarily be positive, however, as parents and teachers may have inappropriate expectations which are generated from information having little bearing on actual child performance in specific situations. Evidence presented by Lavelle and Brophy and Good suggests that parents and teachers may disregard performance data that are inconsistent with their initial expectations. It is possible that parents and teachers may develop and maintain particular perceptions and expectations for children, particularly expectations for failure; in such cases the attributions rather than the actual performance determines educational decisions.

The present line of research provides information about children's characteristics which lead to particular attributions when parents and teachers are evaluating performance outcomes for predicting future behavior. The veracity of adult perceptions need re-evaluation and re-examination, however, in order that educational decisions can be made on current and accurate performance data. Findings relating adults' perceptions of the causes of successful and unsuccessful behavior to educational attitudes and expectancies about preschool children suggest the need for strategies to assist in facilitating appropriate understanding of the basis of decision making. The attribution research in REACH documents the impact of attributions on adults' perceptions of and expectations for handicapped children. Our work has demonstrated that attributions vary as a function of children's handicapping conditions, of task and situational conditions, and according to the relationship of adult to child. The work extends the body of evidence and theory provided by Weiner and Brophy and colleagues, and argues for incorporation of an attributional analysis in the training of professionals who work with handicapped young children. Presentations and publications for this line of research are listed below.

Keogh, B. K. Children's temperament and teachers' decisions. In M. Rutter (Ed.), Temperamental differences in infants and young children. London: Ciba Foundation, 1982, in press.

Keogh, B. K. Temperament as an influence on learning disable pupils educational and personal social competence. Manuscript in review, 1982b.

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Social Competence

(Chan & Eldredge)

The increased interest in the development of social competence in children (Affleck, 1977; Anderson & Messick, 1974; Zigler & Trickett, 1978) reflects a growing appreciation of the importance of social competence and social skills in the mental health of children. While some efforts have been made to train the social skills of children (Asher & Renshaw, 1981), overall there is a limited body of data which could be taken to justify training particular competencies.

In an extensive review of the literature, Greenspan (1979) found that the skills which researchers had investigated could be classified under three major categories: social sensitivity, the ability to understand the meaning of a social event; social insight, the ability to understand the processes underlying social events and to evaluate them; and adeptness or social intelligence, the ability to intervene effectively in interpersonal situations and to influence successfully the behavior of others.

The social development group within REACH attempted to develop measures of certain sub-areas of the above three categories and to determine the relationship between children's performance and teachers' ratings of social competence and peer ratings of popularity. In addition, we sought to determine the relationships between the social competence measures and demographic, socioeconomic and personal characteristics of children.

Because all existing teacher rating scales of social competence were lengthy or expensive to administer, our first efforts were toward development of a reliable and easy-to-administer rating scale which teachers could use to rate the social competence of children in their classroom. Such a scale was developed and was found to have acceptable test-retest reliability and concurrent validity (Hamilton, in preparation, 1982).

Several measures of children's emotion recognition skills were also developed. Specifically, we were able to assess children's ability to label facial expressions of emotion, to identify situations in which they felt particular emotions, and to identify what facial expression of emotion would be most likely to be shown on a child's face in each of a series of selected social situations. Earlier published work in this area suffers from several shortcomings, e.g., limited information about reliability or validity of the measures used; facial expressions in photographs confounded with other factors such as posture, head postion, or hand gesture; and, failure to consider the anatomical components of facial expressions of emotion. REACH investigators selected photographs showing facial expressions of particular affects using the facial component scoring system developed by Ekman and his asociates (Ekman & Friessen, 1975). In addition, all photographs of emotion eventually used in our study were judged by 80% or more of groups of undergraduate students as showing the emotion in question. Concurrent validity of this measure was good; however, test-retest reliability was found to be only moderate to good based on a sample of 82 preschool children who were administered the measure. The preschool data were gathered as part of the collaborative efforts with Stipek and Keogh.

The tests for emotion expression were administered to a random sample of 82 preschool children at three schools in a large metropolitan area. All socioeconomic levels were represented in the sample. In addition, the sample contained a relatively large number of at-risk children. Results indicated that the facial emotion measures were related to such variables as number of siblings, mother's and father's education and occupation, the child's mental age, and (in some cases) ethnic group membership and chronological age. However, the emotion recognition measures were not significantly related to teacher ratings of social competence or to the peer ratings of popularity (Eldredge, in preparation, 1982). Thus, while many social skill training programs have included the teaching of emotion recognition and emotion labeling, the findings of our studies do not suggest that these skills are related either to peer popularity or to teachers' ratings of social competence, at least at the preschool age. There was, thus, a lack of support for the practice of teaching such skills in the hope of building social competence or peer popularity, at least for preschool children.

Two measures of social problem-solving ability were developed as part of this program of research. The first is a measure of children's ability to produce alternative strategies which could be used to solve hypothetical social dilemmas. The second requires subjects to rank and rate the effectiveness of various social strategies to solve the same dilemmas.

In general, the social problem-solving measures were found to be related to teacher ratings of social competence but not to measures of peer popularity (Ackerman, in preparation, 1982). Children rated by their teachers as being in the top one-third of their class in social competence produced more socially appropriate strategies than did other children. Interestingly, children in the middle one-third of their class produced the greatest number of different solutions for solving the dilemmas. Children in the highly competent group (as rated by teachers) rated the socially appropriate strategies as being more effective in solving social dilemmas than did members of the other two groups. Children in the middle one-third of their class in social competence rated the socially appropriate strategies as more effective than did the children in the lower one-third of their class.

No relationships were found between children's performance on either of the measures of social problem-solving ability and the peer rating scales. This may indicate that for preschool children factors other than social skills are important in determining how popular a child is with peers.

Both theoretical work and research in the area of social competence in children is in its infancy. The following are offered as suggestions for future research. More work should be done in developing a theory of socially competent behavior. From such a theory (or theories) researchers could determine what must be included in an assessment of social competence. Systematic testing of such theories will lead to a better understanding of social competence. There is need for work in the role of emotion expression and recognition in children's interactions. This could be accomplished using observational studies of ongoing interaction in the natural environment or in contrived situations. Two points deserve clarification when planning work on this topic. First, there is need for a developmental perspective. What is socially successful and competent behavior at one age may not be so considered at a different age. Second, a cross-cultural perspective may be necessary. What is socially competent or successful in one culture (or subculture) may not be in a different culture. Such a perspective has implications for those attempting to train social competence. By training a child to eliminate certain behaviors in one setting, one may create problems for that child by removing behaviors from his repertoire which are required for successful behavior in another, culturally different setting.

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Attention

(Krupski)

Children with learning handicaps, such as children with mental retardation and learning disabilities, are know to exhibit more frequent attention problems than their nonhandicapped peers. For the past five years, the Attention Study Group has had as its fucos such problems of attention as well as the reltionship between attention and learning. The outcomes of this five-year period of study are summarized in the report that follows.

The conceptual framework that has guided the Attention Study Group's work is summarized in two papers (Krupski, 1980, 1981a). In brief, we have worked under the assumption that episodes of inattention are the result of an interaction between particular child and/or situational and task variables. As such, our strategy has been to explore those conditions under which behaviors reflecting both attention and inattention are expressed. We have then attempted to extract features common to each of these conditions in order to formulate hypotheses about specific variables that exert control over attention processes. Our intention in this work has been twofold: First, to identify theoretical links between attention and learning processes; and second, to explore extensions of these theoretical links in order to provide a practical knowledge of those classroom conditions that facilitate attention and learning in intellectually impaired children.

Results of literature reviews and experiments conducted within REACH have allowed for the formulation of several working hypotheses related to the expression of attentoin problems. Our work indicates that episodes of inattention are related to particular child and task characteristics. Results of studies focused on each of these areas are summarized below.

Child Characteristics

The most consistently reported child characteristic relating to attention problems is the presence of a learning handicap. As mentioned earlier, results of numerous studies indicate that children with learning handicaps exhibit attention problems with significantly greater frequency than their nonhandicapped peers (Krupski, 1980, 1981a). Within the category of learning handicapped children, however, it appeared that individual differences in attentive behaviors may be related to particular noncognitive variables, such as the learning handicapped child's perception of the task at hand.

In order to address this issue, the relationship between learning handicapped children's perceptions of three classroom subjects (reading, math, and nonacademics) and actual classroom behavior observed while they worked in each of these school subjects was studied (Krupski, Aumann, & Burstein, 1982). It was found that children worked independently most often on school subjects that they ranked as easiest and liked the best; they worked most often with a teacher or tutor on those school subjects that they ranked as most difficult and as least liked. It was also found that children spent significanlty more time on-task when working with a teacher or tutor relative to when they worked independently. These data were interpreted as indicating that the more frequent teacher attention in unfavorably ranked school subjects was probably due to the greater likelihood of children being inattentive during these times.

Task Characteristics

One important influence on attention is the type of task on which a child is working and, specifically, the cognitive demands associated with this task. Two literature reviews (Krupski, 1980, 1981a) as well as one experiment (Krupski, 1981b, 1982a) have led to the conclusion that normal children can be expected to exhibit relatively high levels of attention regardless of the task on which they are working. Learning handicapped children, on the other hand, seem to vary in their attention depending on the task; with these children, significant problems of attention appear to surface when they are required to work on cognitively demanding tasks and are often not apparent when the task has few cognitive demands.

An example of this point is provided in the experiment by Krupski (1981b, 1982a). In this study, a group of mainstreamed learning handicapped children as well as a group of their nonhandicapped classmates who were of the same sex and age were observed while working on three types of classroom tasks that varied in cognitive demand: Type I tasks were judged to reflect high cognitive demand (e.g., reading and mathematics); Type II tasks were judged to reflect an intermediate degree of cognitive demand (e.g., copying letters from the blackboard, penmanship); and Type III tasks were judged to reflect a low degree of cognitive demand (e.g., playing with clay, drawing a picture of the child's choice).

Results indicated that the nonhandicapped group spent about 80% of observed time on-task, regardless of the type of task they were working on. Learning handicapped youngsters, however, varied in their on-task behavior as a function of task demand: They spent least time on-task during Type I tasks (69%), an intermediate amount of time on-task during Type II tasks

(78%), and an extraordinarily high amount of time on-task during Type III tasks (92%). Thus, for handicapped children, the degree of on-task behavior observed was directly related to the degree of cognitive demand judged to be required by the task, with least on-task behaviors occurring in tasks judged highest in cognitive demand.

Results of this study are currently being replicated and extended with a group of preschool handicapped children (Burstein, 1982; Krupski, Burstein, & Rubinstein, 1982). The purpose in this later study was to document the emergence and developmental course of attention problems and other maladaptive behaviors that are commonly observed in the school-age handicapped child. This project is an extensive one as it involved two years of observations in two separate preschool settings. Preliminary results indicate that problems of attention are related to severity of handicap among the preschool sample.

A second aspect of task characteristics was the focus of another experiment (Krupski & Lang, 1979). Here, a detailed analysis of off-task episodes was performed while learning handicapped children worked on tasks with high cognitive demand (language arts and mathematics). It was found that off-task episodes occurred with highest frequency when children reached distinguishable junctures in a task. For example, off-task episodes often occurred immediately after a child completed a problem, a page, or a distinguishable component within a problem or a page. Another type of juncture identified was when students began a task. Taken together, end of task (or end of a component within a task) and beginning of task junctures preceded 78% of observed off-task episodes in this particular experiment.

Why do children go off-task when they reach junctures within the task? One explanation for this observation is that children with attention problems are more vulnerable to distraction when they reach a juncture in their work, relative to when they are in the middle of solving a math problem or reading a page of text. Although we observed multiple instances of potentially distracting events occurring when a child was in the middle of a task, in no case did such events distract a child. It was only when the child reached the end of a task (or component of a task), or when the child appeared to be experiencing uncertainty about how to begin a task, that external events actually became effective distractors. Thus, within the domain of tasks with high cognitive demand, it appears that distinguishable junctures within a task are related to episodes of inattention.

To summarize, completed studies indicate that attention problems among learning handicapped youngsters emerge primarily when these children work on tasks with high cognitive demands. Attention problems appear less frequent or are nonexistent when these youngsters work on tasks with low cognitive demands. Such results make it apparent that the relationship between attention and cognition is an intimate one and suggests that a greater understanding of cognitive factors may be essential to uncovering the fundamental mechanisms that underly learning handicapped children's problems of attention.

It is for this reason that the last study in the series reviewed here was undertaken (Krupski, 1981b, 1982b). The purpose in this work was to explore possible reasons why retarded children perform poorly on tasks that require them to deal with visual information, such as letters or numbers. Two possible reasons for their poor performances on tasks of this nature were examined in this study. The first had to do with scanning skills. The question asked here was: Do retarded children perform poorly on tasks requiring visual scanning because they adopt haphazard and nonsystematic scanning strategies? To answer this question, groups of retarded and normal children were presented with two types of tasks. One type required them to remember one item and then to scan a card which had two, three, or four items displayed on it; their job was to indicate whether the item they had memorized was one of those on the display card.

It was found that retarded children did very well on this type of task. In fact, their performance was indistinguishable from normal children's. Since good performance on this task requires systematic comparison of the memorized item with each item on the display card, it seems safe to conclude that under these conditions, retarded youngsters were using some type of systematic search strategy. This indicates that fundamental search skills were probably intact in these youngsters and suggests that future research efforts would be most profitably focused on other aspects of visual processing skills.

The second type of task required them to remember two, three, or four items and then to examine a card with a single item displayed; their job here was to indicate whether the single display item was the same as any that they had memorized. Results on this second type of task were quite different. Here, retarded children performed very poorly when compared to the normal children. Retarded children's performance became increasingly inferior to the normal children's with each additional item they were required to remember. This result indicates that retarded childen's poor visual processing performance is related, at least in part, to some aspect of memory function. Clearly one implication of this finding is that the area of memory offers rich possibilities for future research.

In this same experiment, retarded children were also presented with two types of stimuli to remember, digits and pictures of unfamiliar boys' faces. It is known that we commit these two types of information to memory in very different ways (Krupski, 1982b). For example, most people of normal intelligence who are presented with a visual representation of the number "5," will, without thinking, say to themselves, "five." In other words, the visual information is automatically transformed into a verbal (acoustic-articulatory) form and is stored in memory that way. This transformation, often called verbal encoding, is known to be a very efficient way to process information. If one employs this strategy, it is likely that the items committed to memory will be recalled with a high degree of accuracy.

If, however, individuals are asked to recall information that is not amenable to verbalization, such as pictures of faces or Arabic letters, they are forced to rely on visual coding. That is, this type of stimulus forces a person to rely on visual memory of the actual physical structure of the visually presented information. This form of coding is significantly less efficient that the acoustic-articulatory encoding described above. Even highly intelligent people tend to remember very little when forced to use a visual coding strategy.

There is some evidence in the literature indicating that although people of normal intelligence transform visual information into the efficient acoustic-articulatory code whenever possible, many retarded people do not (Krupski, 1982b). Rather, the evidence suggests that many retarded people, especially those with IQ's less than 59, rely almost exclusively on the inefficient visual coding strategy.

The two types of stimuli used in the experiment described here (Krupski, 1981c; 1982b) were digits and pictures of boys' faces. Based on the preceding rationale, it was predicted that mentally retarded children would perform poorly on tasks that required them to remember digits, relative to a group of normal children. This prediction was made on the assumption that retarded children would not transform the digits into an acoustic-articulatory code and therefore would remember very few of them. Normal children, it was assumed, would be making this transformation and would, therefore, exhibit relatively superior performance. At the same time, no differences were predicted between normal and retarded children on the task that required them to remember the faces. The reasoning here was that both groups would be forced to use the inefficient visual coding strategy and would both, therefore, perform poorly.

Despite this rationale, the results did not support the predictions. Retarded youngsters performed poorly relative to the normal youngsters regardless of which stimuli they were asked to remember. This suggests that the verbal encoding hypothesis and its relation to retarded individuals requires more critical analyses.

In summary, results from the series of studies conducted by the Attention Study Group indicate that particular child and task characteristics are related to the expression of attention problems. Relevant child characteristics include the presence of a learning handicap as well as the child's perception of the task at hand. Relevant task characteristics include the cognitive demand of the task at hand as well as particular structural characteristics of the task. It appears that tasks requiring children to commit more than two items to memory may be particularly troublesome for the retarded, although the scanning of multiple-item displays poses no serious problem. The intimate relationship between episodes of inattention and cognitive demands suggests that future research focused on this relationship would be a promising direction. In particular, further explanation of memory function and the processes involved in verbal encoding merit closer examination. Presentations and publications are listed below.

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Krupski, A. Display vs. memory search among mentally retarded and nonretarded youngsters. Paper presented at meetings of the American Psychological Association, Los Angeles, August 1981. (c)

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Krupski, A., & Lang, R. The relationship between structural task characteristics and episodes of inattention in children with serious attention problems. Paper presented at the meeting of the 5th International Congress of the International Association for the Scientific Study of Mental Deficiency, Jerusalem, Israel, August 1979.

A-3: Support Systems

Recognizing that the development of handicapped young children is influenced by environmental as well as child characteristics, REACH researchers addressed two major topics: (1) Parents' Use of Resources and (2) Intervention Programs. Under the direction of senior investigators Kopp and Keogh, Young conducted an in-depth study of factors influencing the use of resources and support systems by parents of handicapped children. This interview was also incorporated into the Longitudinal Study where particular emphasis was placed on understanding the nature of resource needs over time. Intervention programs and their impact on children's experiences in schools were investigated in a series of studies by Keogh, Burstein, and Wilcoxen. Components included studies of program structure and of in situ experiences using observational and ethnographic techniques. Support System research is reported in two sections: Programs and Interventions; and Parents and Resources. A listing of dissemination activities is also included.

Programs and Interventions

(Keogh, Burstein, & Wilcoxen)

Three major projects on early intervention programs were concerned with the characteristics of preschool programs. These projects were directed at (1) documentation of the structural characteristics of preschool intervention programs; (2) delineation of the relationships between the characteristics of preschool programs and the experiences of handicapped children in classrooms; and (3) description of the specific experiences of selected handicapped children in mainstream programs. The latter two projects were carried out in ongoing intervention programs using primarily observational methods.

Program Structure (Burstein, Keogh, & Wilcoxen)

Considering first the structural aspects of intervention, it is clear that preschool programs differ in a variety of ways. In order to make better sense out of the many early childhood programs, to allow comparisons among programs, and to delineate program effects, it was necessary to develop more powerful tools and techniques with which to describe programs. As a step toward meeting these needs, work was focused on developing a system to document the structural aspects of preschool programs. The project was carried out in three phases: identification of structural aspects of early intervention programs; development of the Program Parameter Inventory; and, use of the Program Parameter Inventory to describe First Chance funded BEH programs.

In Phase one research activities focused on identification of the structural aspects of early intervention programs. This involved a comprehensive literature and documentation search which provided the basis for definition of program components. Major library search systems, including ERIC, were used to gather systematic and detailed descriptions of programs. The search yielded a national sample of preschool programs for handicapped children.

During Phase two work was directed at developing a comprehensive, yet feasible, system for describing early intervention programs. Following several pilot tests and refinements, the Program Parameter Inventory (PPI) was completed. The PPI is composed of nine program components which describe: children served, program characteristics, space utilization, respondent information, relationships with other organizations, parent involvement, funding, staff, and inservice training. The Inventory is to be completed by directors of preschool programs serving handicapped children. Two primary forms were developed; one for mainstreamed and one for non-mainstreamed programs. Questions are essentially the same but allow for mainstreamed programs to report separate information about handicapped and nonhandicapped children. Each form has three subsections, each taking no longer than 45 minutes to complete. A close-ended format ensures feasibility of completion and allows computer analysis of responses. Several open-ended questions allow for specification of variability among programs. Copies of the PPI may be found in the Appendix.

Following development of the PPI, the final phase of the project was directed at documentation of preschool intervention programs. The Program Parameter Inventory was sent to 75 BEH funded First Chance Network Programs. Twenty-five programs were randomly selected from each of the first, second, and third year First Chance Programs. Complete inventories were received from 42 programs which served handicapped children only, and three programs which served both handicapped and nonhandicapped children. Data provided detailed descriptive information about handicapped children and the preschool intervention programs in which they were enrolled. Findings are in final stages of writing up (Burstein & Keogh, in process).

On the basis of these data it is possible to provide some overall descriptions of intervention programs. Forty-two programs enrolled handicapped children only; 912 children were preschoolers (ages 2 to 6). The majority of preschool children were male (61%), Caucasian (72%), and of middle or lower SES backgrounds (71%). While a variety of handicapping conditions were represented, three handicapping conditions comprised over half the population in the preschools in the study: multi-handicapped (22%), speech handicapped (20%), or mentally retarded (14%). Most program directors characterized their children as moderately handicapped (57%). Criteria most often cited for entrance or exclusion in programs related to specific handicapping conditions or to severity of handicap. Programs were often affiliated with school districts (31%), colleges/universities (19%), or private tax-exempt organizations (31%).

Programs were diverse in the services provided to children. However, when severity of handicap was considered, certain patterns among services were identified, providing a picture of differentiated services for minimally, moderately, and severely handicapped children. These patterns deserve note. Programs that predominantly served minimally handicapped children were typically affiliated with school districts or private tax-exempt organizations. Most children in these programs received speech therapy, language therapy, and social services. Children attended school for four to five half-days a wweek; classrooms averaged approximately nine children and the adult-child ratio was one to four. The majority of these children were mainstreamed.

There were some similarities among schools primarily serving minimally handicapped children and those serving moderately handicapped children. Both kinds of programs were affiliated with school districts and private organizations; most children received speech therapy, and weekly schedules and class size were similar. In addition to speech therapy, children received counseling and physical therapy. The adult-child ratio was somewhat higher in programs for moderately handicapped children than in programs for minimally handicapped children; i.e., one to three rather than one to four. Furthermore, children were usually in nonmainstreamed or only partially mainstreamed settings.

Finally, several characteristics of programs predominantly serving severely handicapped children emerged. These programs were typically affiliated with private organizations. Children received more services than did handicapped children in other programs; a majority of children received psychological testing, occupational therapy, physical therapy, medical and social services, and counseling. Children were most likely to attend school for full days, four to five times a week. Class sizes were smaller than in other programs, approximately seven children per class and the average adult-child ratio was one to three. Almost all children were in nonmainstreamed settings.

In general, then, programs serving more severely handicapped children provided more services, had smaller class sizes, and had a lower adult-child ratio than programs with less severely handicapped children. Furthermore, severity of handicap was related to mainstreaming; as expected, less severely handicapped children were more likely to be mainstreamed than were more severely handicapped children.

Program Characteristics and Children's Experiences (Burstein)

A second project in this program of research was concerned with the relationship between program characteristics and the experiences of handicapped children in classrooms. The purpose in this study was twofold: to describe the experiences of preschool children in mainstreamed classrooms; and, to investigate relationships between the organization of classrooms (i.e., grouping, supervision, teacher direction) and preschool children's experiences as evidenced by their time on-task, interaction with adults, and interaction with peers. It was predicted that there would be differences in handicapped and nonhandicapped children's experiences and that these would be related to classroom organization (Burstein, 1982).

All handicapped children (7 males, 2 females) enrolled in four classrooms in one preschool in Southern California were observed. Each handicapped child was matched with a nonhandicapped child of the same sex and age who was enrolled in the same class (total N = 18). The children ranged from 2.8 to 6.0 years of age. Handicapping conditions included 6 developmentally delayed children, 1 Down syndrome child, 1 cognitively impaired child, and 1 autistic child. Children ranged in severity from minimally handicapped to severely handicapped.

Children were observed while they participated in three settings that varied in organizational characteristics: center time, rug time, and outdoor play. Rug time was a large group setting which was structured and supervised by the teacher, all children in the class participating at the same time. Center time was characterized by small group or individual activities that were chosen by the child. Children were usually supervised by an adult. Outdoor play was similar to center time in grouping and child choice but provided less supervision. Rug time was judged to be the most highly structured setting of the day; center time involved an intermediate degree of structure; and, outdoor play was the least structured.

A time sampling observation instrument was developed which focused on three types of information: Contextual information (time spent in grouping and supervision situations), task involvement, and interaction with adults and peers. Data on each child were collected in 2½ minute periods, in a set rotation, resulting in a minimum of 60 minutes of data for each child during center time and outdoor play, and a minimum of 30 minutes of data for each child during rug time. Children were observed daily over a six-week period.

Three major findings in this study were: handicapped children differed from nonhandicapped children in the kinds of experiences they had in mainstreamed classrooms; both handicapped and nonhandicapped children's experiences differed as a function of classroom organization; and handicapped and nonhandicapped children's experiences were affected differently by classroom organization.

Differences in experiences for handicapped and nonhandicapped children were evidenced in the time they spent with other children and adults. During center time and outdoor play handicapped children spent much of their time in small groups if adults were present; otherwise, they were likely to be alone. Nonhandicapped children, on the other hand, spent most of their time in small groups whether or not adults were present; in center time they spent more time in small groups with adults present than in outdoor play where they spent more time in small groups without adults.

Handicapped children also differed from nonhandicapped children in their time on-task and in their interactions with adults and peers. Handicapped children spent less time on-task, interacted more frequently with adults, and interacted less frequently with peers than did nonhandicapped children. In addition, handicapped and nonhandicapped children's interactions with peers were differentially related to setting. Nonhandicapped children differed in time spent interacting with peers across settings, interacting more frequently with peers in outdoor play and center time than in rug time. Handicapped children's interactions with peers were similar in each setting. Furthermore, time on-task tended to be related to setting for handicapped children only. Handicapped children spent more time on-task in center time than in rug time, but nonhandicapped children's time on-task was similar in both settings.

Behaviors of both handicapped and nonhandicapped children varied as a function of grouping and supervision contexts. When target children were in small groups and/or with adults, they remained on-task; when alone the percentage of time on-task decreased markedly. Target children interacted more with adults when in individual situations than in small groups. They interacted more with children when no adults were present than when adults were present.

Severity of handicap interacted with the contextual variables of grouping and supervision. During center time children ranked as more severely handicapped in social development spent less time in small groups and more time in individual situations with adults present than did children ranked as less severely handicapped. In addition, severity of handicap in both cognitive and social development was strongly related to interaction with peers. More severely handicapped children were less likely to interact with peers than were other nonhandicapped children in all settings. No significant relationships were found between rankings on severity and time on-task or interactions with adults.

Finally, observations in center time and outdoor play provided a picture of the kind of activities engaged in by handicapped and nonhandicapped children, including the variety of activities in which they were engaged and the frequency with which children changed from one activity to another. Handicapped and nonhandicapped children spent their time somewhat differently in center time. Handicapped children were more likely to engage in activities involving school readiness materials while nonhandicapped children were more likely to engage in imaginary play activities. Furthermore, handicapped children selected more different kinds of activities and changed activities more frequently than did nonhandicapped children. During outdoor play, on the other hand, handicapped and nonhandicapped children were engaged in similar kinds of activities and changed from one activity to another with similar frequency. Handicapped children were engaged in fewer kinds of activities than were nonhandicapped children, however, a reverse finding from that of center time.

In sum, the nature of children's preschool experiences was found to vary relative to program organization and teacher direction/supervision. Observational data in the present study suggest strongly that handicapped mainstreamed children are particularly influenced by the context and organization of preschools, and that the program characteristics must be taken into account when planning mainstream placement for preschool handicapped children.

Ethnographic Study (Wilcoxen, Keogh, & Lazar)

A third approach to the study of handicapped children in preschool programs was carried out using an ethnographic method. The goal in this research was to obtain a detailed, qualitative description of the life of handicapped preschoolers in mainstreamed settings. Two specially trained observers spent over 20 hours in each of two classrooms in order to collect comprehensive data sampling the range of children's experiences. We thank Professor Harold Levine of the UCLA Graduate School of Education for his continuing consultive help in this study.

Observations were made of three children: A cognitively impaired child, an emotionally disturbed child, and a hearing impaired child. In addition, parents and teachers of these children were interviewed.

The ethnographies revealed that the handicapped children, while physically present and to some extent involved in the school activities, were socially isolated. Their interactions were more frequent with teachers than peers. In general, the target children had limited ability to initiate and sustain social interactions with their peers. Teachers, unlike peers, went out of their way to carry the conversational burden in their interactions with these children. Children's acquisition of interactional skills came primarily from teachers, as the nonhandicapped peers provided models that were very discrepant from the handicapped children's skill levels. Further, the nature of peer interaction seldom provided an opportunity for the handicapped child to practice emerging communication skills. The handicapped children were not openly rejected by their peers; they were simply ignored.

The ethnographic data suggested that, relative to social interaction, the handicapped children's needs in the traditional areas of curricula were met in a more satisfactory manner. In the case of the cognitively and emotionally impaired children, there were many university students and volunteer aides in the classroom in addition to the teacher and regular aide. With this adult-child ratio there was frequently an adult available to monitor and guide the handicapped child's activities. Therefore, these children were usually involved during instructional periods. Although the kind and level of activities and the quality of performance was lower than that of the other nonhandicapped children, there appeared to be appropriate modifications of the curriculum for the needs of the handicapped children. When not attended by an adult, however, the handicapped children tended to be unfocused and uninvolved. Without a reasonable adult-child ratio it is likely that these children would not have received the instruction they needed.

The hearing impaired child, on the other hand, was enrolled in a typical preschool class of 15 children with one teacher and one aide. This child was bright and was able to follow the regular curriculum with little assistance from the adults. He employed three basic strategies: visual monitoring of peers; making inferences based on past school experiences; and, asking the teacher when the first two strategies failed to clarify what was expected. In addition, this child had already mastered the readiness skills emphasized in the class and, therefore, did not have the burden of learning new instructional content. In this case the child was able to benefit from peer modeling and was developing school appropriate behaviors and interactional skills in a teacher-directed context. However, in a non-teacher-directed situation such as free play, this child had socially isolating experiences similar to those of the cognitively and emotionally impaired children. Situations that appeared to encourage the development of social interaction skills with peers were small group activities with indirect teacher supervision and direction.

Several conclusions may be drawn from the ethnographies (Wilcoxen & Keogh, 1982). First, placement in a mainstreamed setting without special intervention and support has a reasonable probability of success when handicapped children have academic and social skills close to the level of their nonhandicapped peers. Second, mainstreaming of children with significant delays in development requires major curricular and instructional modifications. Third, instructional and physical information does not insure social integration. Teachers know how to intervene and teach academic skills but are poorly prepared to teach social skills. The handicapped children in the ethnographies were essentially socially isolated. If the major goal of mainstreaming for handicapped preschoolers is socialization, teachers are going to need information on the development of social skills. Our data suggest that handicapped children do not acquire these skills by merely being enrolled in a regular preschool program.

Implications from the Program and Intervention Research

Taken as a whole, findings from the three major studies provide insight and direction to those implementing and evaluating preschool programs for handicapped children. The Program Parameter Inventory (Burstein & Keogh, 1982) provides a comprehensive technique for describing programs serving preschool handicapped children. It allows identification of the kinds of children enrolled as well as of the nature of the services provided. The PPI may be used by program directors as part of evaluation efforts and by funding or monitoring agencies to compare among programs. Systematic use of the PPI provides a method for identifying program components, particularly for identifying program ommisions or gaps. Use of the PPI over time allows determination of change and progress, thus, serving needs of both program and extra-program evaluators. The PPI is one of the few comprehensive systems available for detailed program description. Its feasibility has been demonstrated.

Findings from the observational studies (Burstein, 1982; Wilcoxen & Keogh, 1982) suggest that classroom organization has powerful effects on the experiences of children in preschool programs. Furthermore, some settings facilitate handicapped children's integration more than others. A structured setting does not appear to encourage social interaction for any children; and, handicapped children have difficulty remaining on-task in a structured setting. An informal setting, on the other hand, has the potential for facilitating involvemet with peers and activities, as evidenced by behavior of nonhandicapped children; however, this setting does not necessarily lead to integration of handicapped children. Handicapped children may not mix with other children, may behave inappropriately, or may be uninvolved in activities. Furthermore, handicapped children often spend their time in situations that are least facilitative to involvement with activities or peers, that is, alone or in individual situations with adults. While an informal setting may provide the opportunity for integration of handicapped children, activities must be planned to facilitate integration.

If handicapped children are to be integrated, efforts must be made to facilitate their involvement with activities and with peers. A setting that is organized to place handicapped children near nonhandicapped children, that provides materials appropriate to handicapped children's needs, and that encourages he cooperative and social interaction of handicapped and nonhandicapped children, is most effective in facilitating the mainstream experiences of handicapped children in regular classrooms. The overall implication for program implementation is that true and functional integration is not just a matter of physical proximity. Rather, functional mainstreaming requires conscious goal setting, explicit operational steps at implementation, and regular monitoring with actual data.

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Parents and Resources

(Young, Kopp, & Keogh)

The use or nonuse of resources and support systems by families of children with special needs may have significant influence on both the development of the child and the quality of family life. Yet the identification and subsequent use of appropriate services and resources is a real problem. Because parents are so intimately involved in trying to obtain help for their child and family, their views on resources and support systems may provide professionals with valuable insights. This study (Young, 1980) was carried out with this goal.

The purpose was to describe the use of resources and support systems by parents of handicapped children and to compare how the handicapping condition, sex of child, mother's level of education, and the socioeconomic status of the family influenced the pattern of use. In-depth interviews, conducted with parents of Down syndrome and developmentally delayed children allowed consideration of several major questions: Do parents of Down syndrome children use different resources than parents of developmentally delayed children? Do parents of boys use different resources than parents of girls, both within and across handicapping conditions? Do mothers of different educational levels or socioeconomic status use different resources? What paths do parents use to find help? What problems do parents encounter in their search for and interaction with resources, support systems, and professionals?

The framework for study was an ecological perspective in which the child, the family, and the larger environment were conceptualized as being inextricably interwoven. In this view, each is influenced by and also influences the other. Thus, the effects of children, families, and their environments are multidirectional. A framework which relies on Bronfenbrenner's ecological approach to research on human development was developed. This perspective was also guided by Garbarino's empirical and theoretical work in the area of child maltreatment, as well as Roskies' descriptions of the social aspects of parenting thalidomide children.

Using Bronfenbrenner's concept of the environment, it was possible to classify supports and resources as existing at different levels of the environment. With this organizational tool, the ecology of families of handicapped children was viewed as a function of sets of forces operating at four levels -micro, meso, exo, and macro.

Data were collected by means of structured interviews with parents, principally mothers, using an interview schedule developed for the project. The "Resources and Support Systems Interview" protocol consisted of 101 questions and numerous subquestions which addressed six areas of inquiry: descriptive information regarding the handicapped child; resources and support systems at the microsystem level; resources and support systems at the exosystem level; paths used by parents in their search for resources; problems parents encounter in their search for services; and, demographic information regarding the family.

Forty families with a preschool-aged (2.0 to 6.5 years) handicapped child comprised the sample. All parents were Anglo with the exception of two fathers and one mother who were Hispanic. Half of the children were Down syndrome and half were developmentally delayed of uncertain etiology. The Down syndrome children ranged in age from 36 to 69 months, with a mean age of 50.75 months (SD = 9.31). The developmentally delayed children ranged in age from 30 to 62 months, with a mean age of 45.85 months (SD = 10.79). Half of each group were boys and half were girls. All children were home-reared and lived in a two-parent family in an urban community. Data were collected in 32 Southern California communities.

Analyses focused upon four major areas: descriptive analysis of the resources and support systems utilized by families using the "Breadth" and "Level" dimensions; assessments of group differences in use of resources and support systems, with data examined for effects of handicapping condition of child, sex of child, mother's level of education, and socioeconomic status of family; descriptive analysis of paths to services; and a descriptive analysis of problems encountered in finding services.

Patterns of use for families of Down syndrome and developmentally delayed children were compared for the various categories of support at the micro- and exo-system levels of the environment. Overall, families were more similar than different in their utilization of specific resources and support systems. The most substantive findings were those related to handicapping condition of the child. The nature of the child's condition related to the time of diagnosis and to the timing of intervention. In 17 of 20 families of Down syndrome children the diagnosis was made during the first two days of life. The remaining three families were informed by the time the child was three months old. Fifteen of the 20 mothers expressed satisfaction with the initial diagnosis and hence felt no need to take their child to any other physician or clinic to obtain a second opinion. In turn, Down syndrome children received their initial help (e.g., infant development program, physical therapy, etc.) at significantly younger ages than did developmentally delayed children. Formal help was first provided as early as three days of life, with the mean being 3.25 months.

In contrast, the age of diagnosis for the developmentally delayed children ranged from 5 to 41 months, with a mean of 20.75 months. Frequently mothers expressed concern about the child's development at a much earlier age, but friends, family, and physicians often dismissed or minimized these concerns. Only five mothers of delayed children reported they did not seek a second opinion regarding their child's problem. The remaining 15 mothers sought from one to four additional opinions in an attempt to obtain a diagnosis about their child. Furthermore, formal help was initially provided to developmentally delayed children when they were between 10 and 41 months of age, with the mean being 24 months.

The type of initial help also varied for the two groups of children. The most apparent difference found was for mother-infant intervention programs; the majority of Down syndrome mothers had participated in such a program, while only six of developmentally delayed children had done so. Underscoring this difference is the fact that the initial help received by seven of the developmentally delayed children included speech therapy or enrollment in a preschool program.

The handicapping condition of the child also influenced use of specific resources and support systems at different levels of the environment. With the exception of one item (i.e., consultation with neurologist), there was greater use of these specific resources by mothers of Down syndrome children than mothers of delayed children. The two groups differed in their Regional Center funding for educational services; participation in mother-infant intervention programs; participation in toddler programs for handicapped children; child development courses/lectures, courses/conferences on the handicapped, reading of books on the handicapped, reading of magazine articles on the handicapped, and knowledge of the California Master Plan. In addition, the two groups of parents differed in the extent to wich they used friends, neighbors, or extended family when upset regarding their child. Finally, the parents differed in terms of their membership in all types of parent organizations, whether it be community handicap groups, self-help groups, or state or national organizatoins for the handicapped such as associations for the retarded. Taken as a whole, these differences suggest that a strong network of support, both formal and informal, exists for parents of Down syndrome children, whereas parents of delayed children frequently face the demands alone, without the benefit of the supports described earlier.

Patterns of use for the various resources and support systems were also examined according to sex of child, mother's level of education, and social economic status of family. In general, there was a high degree of similarity in the support systems used regardless of the characteristic examined. It should be noted, however, that this was a well educated sample of mothers (average years of schooling was 14), and in addition, the sample was biased toward families of middle- and upper-socioeconomic status. It may be that families with more diverse educational and socioeconomic backgrounds use different resources and support systems, rely on different paths to services, and encounter different problems in their use.

Parents used four major paths to services: Professional avenues, such as Regional Centers, physicians, and teachers; non-professional avenues, such as friends, relatives, and parent groups; personal avenues such as phone book, literature, media; and miscellaneous avenues. Salient professional paths utilized by all parents in their search for resources included "Regional Centers" and "teachers or schools." Additionally, the nonprofessional avenues known as "parent groups" and "informally from parents of handicapped children" played important roles for parents. Significant differences between mothers of the two handicap groups emerged on three nonprofessional avenues: "Friend," "parent group," and "informally from parent of handicapped child." In each instance, mothers of Down syndrome children reported higher use of that path than did mothers of delayed children, which once again reflects the difference in available support networks.

Mothers reported that problems encountered in their search for and interaction with resources and support systems clustered into four major areas: "Informational problems" (e.g., didn't know where to go, thought we didn't quality), "personal problems" (e.g.,, transportation problems, work schedule conflicts), "institutional barriers" (e.g., long waiting lists, communication problems), and "miscellaneous problems" (e.g., child has no diagnosis). An analysis of the problem list considered as a whole, as well as each of the four clusters, revealed that the incidence of problems in general and the cluster "personal problems" differed somewhat for each handicap group. Mothers of delayed children reported a higher incidence of problems in securing help than did mothers of Down syndrome children.

Despite the differences in the range of problems reported, there were some experiences which parents of Down syndrome and developmentally delayed children seemed to share. Many of their searches were largely self-directed due to the lack of information, knowledge, and direction from professionals. Thus, establishing a link with proper resources was a very real problem. In addition, once the resources were obtained, parents often had difficulty communicating with professionals and dealing with professionals' attitudes. These difficulties characterized parents' initial search for services, as well as the continuing search dictated by the changing needs of their child and family. Finally, many parents expressed an urgent need for a single professional who was responsible for coordinating all aspects of the child's care at any given time and, more importantly, as the child developed over time.

Findings from this study are being extended in ongoing work by Young in which families in the original study sample are being followed up in order to determine their current status. Interviews have been conducted with over half of the families and the data have been coded and prepared for processing. Many interviews have been conducted by telephone. All interviews have followed a semi-structured format in order to ensure comparability of data. Findings to date are consistent with earlier work and pinpint particular stress areas for families as their handicapped children develop over time. This work will be prepared for publication in the summer of 1982.

In summary, this research confirms that parents of children with special needs face a unique and complex set of demands. The search for and utilization of services and resources place demands on parents' time, energies, and willingness to persist. Moreover, the nature of the handicapping condition, limited in this study to Down syndrome and developmental delay of uncertain etiology, was linked to how resources and support systems were used. In specific, the nature of the child's condition influenced the time of diagnosis and the time and type of initial intervention. It influenced the use of mother-infant intervention programs and toddler programs for handicapped children, child development courses, courses on the handicapped, and membership in parent organizations. The child's condition also influenced the use of non-professional avenues to information, such as "friends," "parent groups," and "other parents of handicapped children," as well as the overall number of problems encountered during the search for services. Finally, many mothers, particularly mothers of developmentally delayed children, reported a sense of aloneness or isolation.

The interview data proved to be rich in implications for professionals engaged in the delivery of services and support. First, the strongest message offered by these parents was that they wished to be viewed as partners, rather than as adversaries, in the diagnosis and ongoing management of their child. Too often they felt they were in a "we-they" relationship and were made to feel they were "only the parent." Parents would like to have their input requested and their concerns acknowledged by interested professionals.

Second, given the number of searches for services which were parent-directed, it is evident that professionals need to become more knowledgeable about the resources and support systems available in their local community. As professoinals are often a prime source of information, they are obligated to keep current in the changing resource picture.

Third, Down syndrome parent groups have demonstrated the effectiveness of parent organizations in providing information, emotional support, and direction for members. These groups have been strong and effective advocates for their children. Parents of delayed children also could benefit from such an organized group.

Finally, parents seek coordinated monitored case management over time, suggesting the need for a single professional who serves as a continuing resource to families. Fragmentation of services and the breakdown of services across agencies and over time add considerably to the problems facing parents of handicapped children.

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A-4: Documentation of Progress

Efforts in the area of documentation of progress have addressed a number of questions: (1) How adequate are assessment instruments and techniques for evaluation of handicapped children and young infants? (2) How adequate are traditional statistical models for analyzing handicapped children's progress? (3) What alternative analyses may be suggested for documenting progress? (4) Are traditional research designs sensitive in detecting changes in children's developmental performance in early intervention programs? (5) What are alternative designs for documenting children's progress?

Initial work included an extensive review and critique of available literature related to instruments, analyses, and designs used in developmental research. Perspectives were strongly influenced by the work of Robert McCall and Joachim Wohlwill. The outcome of this review process included two working papers (Cadwell, Keogh, & Kopp, 1978; Watson, Keogh, & Kopp, 1978) which identified methodological issues related to the study of children's development. Subsequent work involved review and critique of assessment instruments commonly used to evaluate handicapped infants and preschool children (Johnson & Kopp, 1980) and, consideration of design and analytic models used to document progress in early intervention programs (Sheehan, 1979a, b, c). Materials from these reviews were also presented at several conferences (Keogh & Sheehan, 1979; Sheehan, 1979d, e).

Content of the reviews suggested that only a limited number of analytic and design strategies were used by evaluators in documenting children's progress. A particular point of interest was the reliance on "prediction" or "rate of progress" designs in the documentation activities of most early childhood special education intervenors and evaluators. This was particularly important given that the most common index of progress was a score on a global developmental test (e.g., developmental quotient, intelligence quotient, etc.). Examination of assessment practices suggested, too, that there was frequent use of assessment techniques of questionable psychometric validity (Johnson & Kopp, 1980). Further, the appropriateness of some of these tests for particular cultural, ethnic, and age groups was questionable.

Also to be considered was the possible biasing or distorting effect of handicapping condition on test performance. In this regard, one concern related to the legitimacy of evaluating handicapped children against norms derived from performance of non-handicapped children. Possible differences in sequence of development, as example, might be overlooked by adhering strictly to normal developmental comparisons. A related concern had to do with the influence of a handicapping condition in one ability area on performance on the test as a whole. These problems, taken together with the recognition that developmental tests provide only gross summarizing scores, suggested that even in successful intervention programs the size of the treatment effects in any one time period was likely to be small and inconsistent (Sheehan & Keogh, 1981a). It is not surprising, then, that summary scores from standardized tests were often of limited value in documenting children's progress or in demonstrating program impact (Keogh & Sheehan, 1981b).

In sum, evidence from early REACH work taught us several important lessons to be considered when using child progress data to demonstrate program impact: Obtained treatment effects are usually small, whatever the intervention program; quantified measures are too gross to document changes suggested by clinical evidence; and, an approach to documenting progress which combines the insights of clinical observation with quantitative confirmation is required.

Subsequent REACH activities were, therefore, directed at: (1) formulation of alternative assessment, design, and analytic strategies, (2) the acquisition of several data sets to be used in analyses of documentation strategies, and, (3) the refinement and test of new documentation variables. The data sets, each of which contain two or more assessments of young children and infants, were used to test the analytic and design strategies developed and proposed by REACH staff. We thank Dr. Janet Reuter and the project staff of Kent State University for their generosity in sharing their data on Down syndrome children. We also thank Dr. Jane Hunt and her colleagues at U.C. Berkeley for sharing their Bayley normative data. Recommendations for evaluating program impact have been formulated and include documentation strategies, analytic models, and an alternative approach to program evaluation.

Documentation and Analytic Strategies

As an outcome of REACH work, Sheehan and Keogh (1981a) proposed four strategies which could be used by program implementors to demonstrate program impact. One approach involves increasing the breadth and power of the program or intervention itself; e.g., increasing the number of hours of instruction, the degree of involvement of parents, and the like. A second strategy leads to the application of more powerful statistical or analytic techniques when dealing with documentation data. Multivariate and covariate approaches, the aggregation and accumulation of documentation information over time and across programs, the reorganization of standard developmental test items, and the like, are suggested. A third recommendation for improving the power of documentation data involves refinement of assessment practices. As handicapped children may be especially sensitive to setting and assessor influences, the careful control of test settings may reduce variability which is unrelated to developmental status. Finally, it was recommended that intervenors broaden the base of documentation information in order to include a number of indices of change. It seems clear that changes in parents' and teachers' attitudes, improvement in children's self-concepts, and the like, may be important indicators of program impact. These changes are likely not reflected in standard psychometric approaches, yet deserve consideration as documentation data.

Analytic Models

Review of common research designs used in evaluation of early childhood special education programs suggested that most intervenors rely on one of three major models (Sheehan & Keogh, 1982). These deserve brief discussion. The first, a single group pre- post-test approach, involves a comparison of common measures on a given set of children at the beginning and end of an intervention period. Based on average scores of the group as a whole, statistical tests are used to determine the significance of the difference between pre- and post-scores. The comparison has appeal and is widely used because it is relatively simple and direct and because such data are almost always available within ongoing programs. The limitations of the design are major, however. It is impossible to disentangle chronological age from change related to program impact; and the aggregation of group data may mask real individual variance. Finally, the straight statistical comparison violates assumptions of independence of samples, and, as has been argued by many, it is necessary to use some covariate model in order to allow for the impact of pre-test status on post-test performance.

A second commonly used pre- post-test comparison model involves collection of data on different sets of children, one group receiving primary intervention, the other some alternate experience or even no intervention. While a bit more sophisticated than the straight pre- post-test model, and derived from the experimental control paradigm used in psychological research, there are a number of limitations to this analytic model. Ethical considerations dictate that handicapped children cannot be randomly assigned to control or to no treatment conditions. Random assignment to group is an assumption which can rarely be met. The realities of program implementation frequently lead to extraneous influences so that program variation cannot be controlled. Thus, this approach is limited because the laboratory model cannot be replicated in an intervention setting.

A third design often used to demonstrate intervention impact is a single subject multiple baseline design most frequently found in programs with strong behavioral orientations. The many examples are variations of the applied behavior analysis approach. This approach has considerable clinical appeal as a method for charting performance of individual children and may, under certain circumstances, allow aggregation of data across children. The questions of generalizability and stability of change, however, continue to plague program implementers who seek to validate programs.

As noted by Sheehan and Keogh (1982) these commonly used analytic models have limitations in demonstrating program impact. The applied behavioral analysis approach provides powerful evidence of change in specific behaviors for individual children; yet, there are problems in generalization, in the aggregation of data, and in the inferences which can be drawn over time and across subjects. The two group pre- post-test comparisons usually fail to meet sampling requirements which allow legitimate application of many powerful statistical tests; there are also ethical considerations which limit this approach. The single group design is confounded with unknown treatment-subject interactions which make it almost impossible to delineate program effects. The very nature of the designs, then, serve to limit the inferences and generalizations which program evaluators seek.

An Alternative Documentation Strategy

In response to the limitations of traditional approaches, and recognizing that objective data are required to document progress, an analytic system yielding quantitative description of children's performance was developed using computerized visual displays (Sheehan & Keogh, 1981b; Sheehan, Keogh, & Watson, 1981). In this system particular attention is paid to the within-child variability or developmental scatter of children's performance. This variability is of particular concern to intervenors and is a likely target for intervention activities; therefore, it is a potentially valuable target of documentation activities. Derived variables identified in this approach to documentation include range and density statistics, as well as numeric indices of patterns of performance. The derived variables quantify expressions of individual variability, allow test of stability of performance over time, identify patterns of change, and permit comparisons of individuals within groups. As the variables are quantitative they allow aggregation for description of groups and comparisons across groups. Empirical test of this analytic system is ongoing. Continuing work is devoted to analyses of data from the REACH longitudinal study, these analyses directed specifically at questions of prediction of rate and amount of progress over time.

A discriminant approach to program evaluation. An outgrowth of the analytic approach just described was the development of an evaluation perspective that combines clinical perceptions with quantitative measures (Sheehan & Keogh, 1982). This approach, identified as the discriminant approach, involves the delineation of subgroups of children based upon clinical evidence, and the quantitative representation of developmental progress of children in those subgroups using the derived variables within the system. We propose this design as a viable alternative to the type of overall group designs so often found in early intervention documentation efforts. The discriminant approach has its roots in the statistical discriminant function technique and, in some cases at least, allows use of that statistical test. Two important aspects of the discriminant approach are that it acknowledges the multivariate character of both children and programs; and, it allows the intervenor-evaluator to ask multiple questions. Further, it makes no pretense of an "experimental-control" design but rather focuses upon differentiation of effects within single groups.

As noted, this evaluation approach involves delineation of subgroups of children based upon clinical evidence. After such subgroups are determined the intervenor identifies potentially relevant variables which are thought to be influences on childrens' performance. Subsequently, child data are analyzed to determine if the a priori delineated subgroups are different on the specified variables. Such analyses might involve the statistical discriminant function test or even more simple analysis of variance. Finally, tentative inferences about program effects are tested through replication with other subgroups and against other variables. The last point is to be emphasized as it is the only way of testing the replicability of the findings. This approach allows delineation of program effects within the context of ongoing interventions. It does not, however, allow the direct causal inference which could be derived from a controlled laboratory study. Further, the formation of subgroups leads to reduced sizes of samples and, thus, to some loss of statistical power. For these reasons the discriminant approach requires replication to ensure stability of data.

Fundamental to the approach is the systematic documentation of children's characteristics and of program components (see Burstein & Keogh in the Support Systems section of this report). Such documentation alone provides clinical information of value to intervenors but also serves to formalize the evaluation process. The discriminant approach has been discussed in detail by Sheehan and Keogh (1982) and is being tested with data from the Kent State and U.C. Berkeley data bases as well as being applied to the analysis of developmental test data from the longitudinal study in Project REACH. These findings are in near final stages of analysis and will be written up for publication during the summer of 1982.

Documenting Language Progress (Wilcoxen & Briggs)

As part of the research on assessment within the REACH longitudinal study, it became apparent that documenting language change in developmentally delayed children was a particularly difficult problem. Summary scores from the standardized instruments on the assessment battery were not definitive in describing handicapped children's language status and were often insensitive to the small increments of change that were unfortunately typical of many of these children. However, it was thought that valuable information that could be useful for both of these purposes was embedded in the individual items on language assessment instruments. As part of REACH work, therefore, Wilcoxen and Briggs (1981) developed an item analysis procedure for the language domain to examine the extent to which the language items on the instruments in this assessment battery sampled the domains of language, and, to determine if such a procedure could provide sensitive information about developmentally delayed children's language development.

The instruments analyzed included the Bayley Scales of Infant Development, the Gesell Developmental Schedules, and the Sequenced Inventory of Communication Development (SICD). A matrix was constructed with linguistic domains on one dimension and developmental age on the other. The linguistic domains included auditory perception, phonology, syntax/morphology, receptive and expressive semantics, pragmatics, and verbal memory. The developmental age ranges covered the period from birth to 49 months. All language items on the Bayley, Gesell, and the SICD were identified and placed in appropriate domain by age cells. The total number of language items on these assessment batteries was 389. There were 42 language items scattered throughout the Bayley, 118 on the Gesell (in the Personal Social and Adaptive Schedules as well as the Language Schedule), and 229 items on the SICD.

When the completed matrix was examined only two domains were poorly represented. There were no items in the phonology domain at the higher developmental levels and there was poor coverage of the pragmatics domain throughout. The other domains were generally appropriately represented; however, the items within the cells varied from 1 to 34. Some cells appeared to contain a more representative sample of items, but when the items within these cells were examined, considerable duplication was found. Further, the range of possible items within any one cell was poorly sampled. In addition, there was a heavy concentration of items in the receptive semantics domain, probably reflecting the ease with which these items are tested.

Comparison of the matrices for the individual instruments revealed that they cover basically the same domains and that the items within the domains are similar. The exceptions are the almost total lack of syntax/morphology items on the Bayley and the exceptional coverage of the pragmatics domain in the Personal Social Schedule of the Gesell.

The ability of an item analysis procedure to provide sensitive information regarding a child's language development was assessed by examining the performance of 15 developmentally delayed toddlers on the language items in the assessment battery. These children were subjects from the REACH longitudinal Study; they were 30 to 36 months old at the time of the first assessment. The battery was administered on three occasions at 6-month intervals. A child's score for each cell was the number of items passed in that cell. All items were scored pass/fail. The mean number of items in a cell passed by all 15 toddlers was computed for cells containing five or more items.

Summary scores at assessment time one indicated an overall developmental delay of approximately one year with a noticeably greater delay in expressive than in receptive language. The lag in expressive language continued to be apparent at assessment times two and three, where receptive language scores also began to lag behind the children's developmental age levels.

When the item analysis procedure was applied, the nature of the delay in expressive language became more evident. While all areas of expressive language were delayed, there was an exceptional delay in syntax/morphology. The greatest gains were in the domain of receptive semantics. At time three when the children were developmentally at approximately the 32 month age level, receptive semantics was the only domain where progress was noted for items within the developmental age range of 31 to 36 months.

In summary, while limited, the standard developmental test instruments do provide useful information regarding language development. An item analysis procedure, such as that described above, increases the power of the analysis in at least two important ways. First, it defines the coverage of the domain of interest; and second, it provides differentiated information about the child's developmental status in the selected aspects of the domain. It should be emphasized that additional procedures, such as criterion referenced assessment or observational procedures, will be necessary to answer questions about child status in aspects of the domain that are poorly sampled. These findings have been presented at several meetings and are being prepared for publication. Presentations and publications of the documentation work as a whole are found in Section VII of this report.

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A-5: Longitudinal Study

Overview

The longitudinal study was designed to document the course of development in a very specific group: children between the ages of 18 and 42 months who were either at risk for delay because of problems in the perinatal period, or who exhibited a mild to moderate developmental delay in one or more areas (cognitive, language, motor). The sample was restricted to one ethnic group, Caucasian, in order to avoid the problem of having to tease out complex cultural/linguistic influences from a relatively small sample. In addition, several categories of developmental delay were excluded from the study: drug-related problems, chromosomal abnormalities, and genetic conditions known to be associated with mental retardation, as well as delay that was associated with neglect or abuse, or delay that was secondary to emotional pathology.

The group was selected for study in part because little descriptive information exists on these children. Despite the fact that developmental delay (DD) comprises a large proportion of all handicapping conditions for older age groups, the category maintains a low profile prior to school entry. Pediatricians and other professionals are wary about labelling children before they have entered the educational system. Additionally, early intervention programs for the handicapped tend to serve children with more visible handicaps, e.g., Down syndrome, severe/profound retardation, orthopedic handicaps. The 1981-82 HCEEP Directory contains survey information from 94 demonstration programs around the country. In the birth through 36-month range, only 3% of the children served were diagnosed developmentally delayed; four percent of the served children between 36 and 69 months received the DD diagnosis.

The questions posed at the outset of REACH research were clustered around three broad areas: child characteristics, issues of measurement, and characteristics of the broader environment. The first child question was related to change over time. "Developmental delay" implies that the gap between mental age and chronological age may be closed, or at least narrowed, with the passage of time. Fundamental questions about children in the REACH longitudinal study had to do with how much change and what kind of change would be made over a two-year period? How would change be reflected in the different domains of development? Of equal importance were questions related to behavioral characteristics of these children, particularly in the areas of self-control and sustained attention. These characteristics were investigated over time in the Infant Laboratory.

Measurement questions were inextricably involved with questions regarding child change, as certain standardized measures (Gesell, Bayley, McCarthy, SICD) as well as project-developed techniques were selected to monitor progress over time. As most developmental tests were standardized on a non-handicapped population, major questions were posed as to their capacity to reflect the abilities of our sample children and their capacity to demonstrate qualitative as well as quantitative change over time (see Documentation of Progress section, this report, for more detailed discussion).

Finally, it was necessary to assess the impact of the environment on the developmental course of the sample, given our commitment to a transactional model of development. Could we isolate environmental influences related to progress? Were characteristics of growth related to characteristics of the environment? Also of interest was study of parenting handicapped children. Questions included: What were the different stresses over time? Could parent perceptions of stress and their satisfaction or dissatisfaction with services be related to rate of progress in the children?

Study Groups

Between March 1979 and December 1980, 69 children between the ages of 18 and 42 months were entered into the Longitudinal Study. All children were either at risk for delay as a result of problems in the perinatal period or already exhibited a delay of mild to moderate degree. The entering DQ/IQ's were between 50 and 85. There were two subgroups in the sample: infants, who ranged in age from 18 to 24 months, and preschool children, ranging in age from 25 to 42 months.

Infant and preschool samples were similar in SES and level of parent education, as well as in a number of child characteristics as shown in the first table (Table VI-13). The entering Bayley MDI (ratio) was 72.9 for the infants, 68.6 for the preschoolers. The majority of subjects in both groups, 77% of the infants and 89% of the preschoolers, were in intervention. Parents of children in both groups reported a high number of medical complications at delivery and in the first month of life; roughly half the children in each group had stayed in the hospital after their mothers were released. In both groups, physical and speech/language delays were among those most often perceived as problems by parents; mental retardation was identified as a problem with much less frequency.

Table VI-13

Sample Characteristics for Infant and Preschool Groups

	Infant (N = 25)	Preschool (N = 44)
Bayley MDI	72.9	68.6
% in intervention	77	89
First month health status	27% pre-term	23% pre-term
	68% first month medical complications	59% first month medical complications
	53% did not leave hospital with mother	45% did not leave hospital with mother
Present problems perceived by parents	Physical (73%)	Physical (61%)
	Medical (31%)	Speech/language (59%)
	Speech/language (23%)	Learning (34%)
	Learning (23%)	Behavior (25%)
	Motivational (23%)	Medical (20%)
	Behavioral (8%)	Retardation (14%)
	Retardation (8%)	Motivational (11%)

Assessment measures were selected to describe children in terms of cognitive, affective, and social components of competence. Cognitive measures included the Bayley Mental Scales, the Gesell Developmental Scales, the McCarthy Scales of Children's Abilities (for those children who reached ceiling on the Bayley), and the Sequenced Inventory of Communication Development (Hedrick, Prather, & Tobin, 1975), which yields a receptive as well as an expressive communication age. In the preschool sample all measures were administered in the homes at six-month intervals, in the presence of the parents (usually mothers). The infants came into the laboratory at six-month intervals where they were given the Gesell in addition to project-developed measures of sustained attention and self-control. The Bayley and SICD were administered in their homes every six months as well (see Table VI-14 for schedule of testing).

Affective measures included the Carey Temperament Scales (Carey, 1973) for the infants, and the Thomas and Chess Parent and Teacher Temperament Questionnaires (Thomas & Chess, 1977) for the preschoolers. Measures of social competence were confined to the preschool period and were represented by the Schaefer-Edgerton Classroom Behavior Inventory (Schaefer & Edgerton, 1978) which was completed by the staff in the intervention programs.

Measures of the home environment included the Caldwell Home Inventory at yearly intervals, and the Resources and Support Systems Interview conducted upon entry into the study. The latter was developed by Dr. Marlene Young (Young, 1980) as part of REACH research. It is focused on parental responses to developmentally delayed children in terms of the recognition of the handicap, problems surrounding diagnosis, and the use of formal and informal resources and support systems. Finally, at the end of the study all parents were given an exit interview designed as follow-up to the Resources and Support Systems Interview. In addition to updating information about the child's diagnosis and intervention, parents were asked about their current perceptions of the child's problems, their satisfaction with existing services, and their sense of the "hardness" or "easiness" of the future in terms of parenting their developmentally delayed child.

Table VI-14

Schedule of Testing in Longitudinal Study

	Entry	6-month Intervals	Exit	Data Source
In-depth interview	*		*	Parent
Resources and Support Systems Interview	*			Parent
Bayley	*	*	*	Child
Gesell	*	*	*	Child
SICD	*	*	*	Child
Temperament (Carey or Thomas & Chess)	*	*	*	Parents and Teachers
Caldwell	*		*	Parents
Measures of sustained attention and self-control (infants only)	*	*	*	Child
McCarthy (preschool only)	*	*	*	Child
Schaefer-Edgerton Classroom Behavior Inventory (preschool only)	*	*	*	Teacher

Infant and Preschool Studies

While the concept of developmental delay is represented across the continuum infancy through preschool, the expression of the delay and the consequences of the patterns of abilities and disabilities varied for the two primary study groups. Further, the appropriateness of the tests and assessment procedures also varied according to age. As a consequence, it was necessary to consider the infancy and the preschool samples as discrete groups, and to study the impact of the delay and of change within each group separately. Findings on child data are, therefore, reported first for the infant sample, second for the preschool sample. The final section contains a summary of family needs and stresses over time based on data from both infant and preschool samples.

Child Characteristics: Infant/Toddler Sample

The sample of infants/toddlers was comprised of 26 subjects, 19 males and 27 females, who were repeatedly observed and tested during their second and third years of life. All children were Caucasian from English-speaking homes; the socio-economic level of the sample was generally middle class. Occupations of the parents ranged from skilled to professional, with 64% of the fathers holding managerial or professional positions. Mean level of maternal education was 13.8 years; mean level of paternal education was 14.2 years. Age of parents at the time of the child's birth ranged from 21 to 37 for mothers (mean = 27.3; SD = 4.1) and 22-36 for fathers (mean = 28.6; SD = 3.9).

All but six children were in intervention programs, and five children received therapy in addition to that offered in interventions. Children were recruited through intervention programs, pediatricians, and a high risk follow-up clinic in a local hospital. All had been identified as being developmentally delayed or at risk for delay.

A summary of some child characteristics, at the time of entry, is found in Table VI-15. As is noted, the children were diverse with respect to developmental age, developmental quotient, health history, and family demographic characteristics. In fact, the most striking aspect of the sample as a whole was its diversity, a fact that is particularly noteworthy given the restrictiveness that was applied during subject recruitment. (All subjects, for example, were from a similar ethnic background, and none had problems related to drugs, chromosomal abnormality, genetic conditions known to be associated with mental retardation, abuse or neglect, or to delay secondary to emotional pathology.)

Knowing that this diversity would compromise our ability to draw conclusions about the children's abilities, we attempted to define the group more precisely by using well-defined sub-categories of risk, etiology, and developmental ages. First, with respect to risk, the term has been used widely although its exact meaning is often difficult to discern (see discussions in Kopp, in press; Tjossem, 1975). Nevertheless, many investigators use the phrase "biological risk" to refer to stresses that arise during prenatal, perinatal, and postnatal life. With young children, stresses can include illness, infection, pre-term birth, and so forth; all share the potential of possibly compromising developmental outcome. A number of infants and toddlers in the

TABLE VI-15

Characteristics of Sample Upon Entry

Chronological age	42.04 (6.7)
Developmental age (Gesell)	15.96 (3.2)
gross motor	14.96 (3.8)
fine motor	16.12 (4.4)
adaptive	16.32 (4.0)
language	14.8 (3.5)
personal-social	17.24 (3.5)
Developmental quotient	75.68 (17.8)
Males, females	19.7
Birth weight (lbs.), $\bar{X}$	6.3 (2.3)
Full term birth, %	73%
Past/Recurrent	
medical problems, %	32%
minor (ear infections)	24%
major (seizures, hospitalizations)	44%
Suspected hearing problems, %	11.5%
Visual problems (treated), %	7.7%
Maternal age, $\bar{X}$	27.3 (4.1)
Maternal education	13.8 (2.4)
Paternal age, $\bar{X}$	28.6 (3.9)
Paternal education	14.2 (2.4)
Paternal occupation (% professional)	49

longitudinal sample had been exposed to prenatal and/or perinatal stresses (pre-term birth, seizures, meconium aspiration, etc.). Accordingly, any child in the sample whose past history indicated a stress of this nature was labeled as "at biological risk."

This designation, however, was incomplete because it did not take into account the developmental status of the children. Part of the sample was developmentally delayed with developmental quotients in the 60 to 80 range, another group functioned within the low normal range (80 to 100), still others functioned at normal or above. Those children who were at biological risk and functioning within the normal range were separated (for some analyses) from those who were delayed.

How certain can one be that developmental delay is actually due to the biological stress that was experienced? Unfortunately, only to a limited degree, since we do not know why one child seems to recover from a stress while another who experienced the same stress shows developmental problems. Because of this ambiguity, the etiology of the delayed child's condition has to be considered "suspect" rather than known.

The issue of etiology was important because the longitudinal sample also included children who showed evidence of developmental delay, but their histories were devoid of known prenatal, perinatal, or postnatal insult. There is come suspicion that delay of this nature implicates a stress or insult that occurred during the prenatal period (see Hagberg, 1978; Kopp, in press). Kopp (in preparation) further speculates that, in general, stress that arises in the prenatal period may lead to poorer developmental outcomes than stress that occurs only during the perinatal or postnatal periods. Her reasoning is based on the following premises: the duration and intensity of stress/trauma/insult in the perinatal and postnatal period can be shortened and alleviated (at least to some degree) by specific treatments. There is no such counterpart in the prenatal period, thus an insult must run its course. Further, a powerful and/or lengthy insult during the prenatal period may damage or distort budding structures, inter-connections, or some other aspect of the emergent central nervous system. In an attempt to examine this line of reasoning, we planned to compare the development of children whose etiology was unknown versus those where it was suspected.

Table VI-16 lists three categories, suspect, known and unknown, that were defined, and the percentage of children in each. As is seen, the suspect and unknown categories each encompass approximately one-half the children. Clearly, biologic risk implies either a suspect or a known etiology if delay is present; and the absence of biologic risk results in an unknown etiology when developmental delay is diagnosed. Table VI-17 shows the sample distribution according to etiology.

Lastly, we categorized each member of the longitudinal sample by developmental age. This was done at entry and at each subsequent testing period. The approach not only had the merit of reducing variability in the group but also had the advantage of letting us examine the similarity or difference in developmental abilities of children of like developmental age (but of differing etiologies or risk status). This question has both theoretical (see Zigler, 1968) and practical ramifications.

TABLE VI-16

Etiologies Represented in Sample of Developmentally Delayed Infants (N = 18)

Definition	Percentage
Suspect: During prenatal or perinatal period, child experienced stress or trauma to system including pre-term birth, seizures, respiratory infections, viral infections, etc.	61
Known: Symptoms that child presents can be unequivocally linked to a prenatal, perinatal, postnatal stress (e.g., spina bifida, Down syndrome, etc.)	0
Unknown: Using parent report and available medical information, there is no known prenatal, perinatal, or postnatal cause for delay.	39

TABLE VI-17

Infant Sample by Biologic Designation and Developmental Status at Entry

		Initial Developmental Status		
		Delayed (DQ < 85)	Developmental risk (DQ 85-95)	Normal range (Q > 95)
Biologic risk designation	Known etiology (spina bifinda)	n=0	1	0
	Suspected (e.g., seizures, preterm)	11	2	4
	Unknown etiology	7	1	0

In sum, the children in the infant sample entered as a heterogeneous group. Heterogeneity often impairs one's ability to tease out casual influences, to define relations, or to make meaningful inferences (Kopp & Krakow, in press). Therefore, homogeneous subgroups were established within the sample for some of the descriptive analyses that are reported. The major subgroup categories that were used included: developmental status (e.g., developmental age, developmental quotient, changes in developmental quotient), known vs suspect etiology. Subsample analyses, though based on small n's, enabled us to examine substantive differences while avoiding confounding webs.

The diversity that dictated the use of descriptive subsample analyses is obvious from reference to Table VI-18. In this table, each subject is listed together with a very abbreviated biological history, initial and final developmental quotients, sex, and designation according to etiology and biologic risk at entry and at the completion of the study. Reference to this table underscores the sample heterogeneity.

Organization of Results

The results that we report below are organized into several descriptive sections. The first section focuses on standardized psychometric measures that were administered repeatedly over the course of two years, with reference to the question of cross-measure reliability and to sub-group designations. The second section reports results of a laboratory based study on sustained attention. Finally, the descriptive results are discussed from the perspective of questions that are raised and directions for future research.

Developmental Test Data

Between-test-reliability. A critical aspect in assessment and diagnosis of infants who are delayed or who are at-risk for developmental delay is the adequacy of the assessment instrument. At the present time, there are more than 100 assessment instruments in use with infants, many of which lack the most basic administration, validity, and reliability information (Johnson & Kopp, 1981). For the longitudinal study, we selected two of the most well-known and widely used assessment measures, the Bayley scales and the Gesell Developmental Schedules. The advantages of the Bayley is its standardization, detailed administration and scoring instructions, and reliability studies. Its disadvantages include the necessity for extrapolation of scores for children functioning two or more standard deviations below the mean expected for chronological age, and the difficulty in testing some sensorily or motorically impaired children.

The Gesell has the advantage of being readily adapted to a variety of child and clinical situations. For example, the order of administration can be modified slightly to match child state/behavior, and parental report can be utilized where necessary (see Honzik, 1976, for discussion). These merits are particularly important when handicapped and/or developmentally delayed children are to be tested. The Gesell schedules (even the newer versions) have the disadvantage of not being as well standardized as the Bayley.

One objective of the longitudinal study was to ascertain whether assessments made with different instruments and in different settings with different

TABLE VI-18

Infant Sample - Subject Information

Subject	Etiology/ biologic designation	Entry DQ	Developmental designation	Exit DQ	Sex
131	no risk	61	DD unknown	65	M
137	no risk	59	DD unknown	62	M
139	no risk	59	DD unknown	48	M
141	no risk	66	DD unknown	71	M
234	no risk	75	DD unknown	88	M
239	no risk	68	DD unknown	96	M
135	no risk	65	DD unknown	--	M
240	no risk	85	Dev. Risk - Unknown	--	M
133	risk: seizures	77	DD suspect	95	M
136	risk: preterm +	84	DD suspect	84	M
138	risk: seizures	46	DD suspect	54	M
140	risk: microceph RDS	68	DD suspect	48	M
144	risk: agenesis corpus callosum	58	DD suspect	59	M
145	risk: preterm, CP	80	DD suspect	81	M
231	risk: blue baby	59	DD suspect	65	F
232	risk: perinatal/labor	43	DD suspect	36	M
146	risk: seizures	46	DD suspect	--	F
142	risk: preterm	74	DD suspect	--	M
132	risk: digestive syndrome, PT	83	DD suspect	102	F
143	risk: preterm	90	Dev. Risk - suspect	108	F
236	risk: seizures	89	Dev. Risk - suspect	103	F
134	risk: seizures	101	Normal	95	M
235	risk: meconium	100	Normal	103	F
233	risk: preterm	104	Normal	143	F
238	risk: meningitis	102	Normal	--	M
237	known: spina bifida	92	Dev. Risk	86	M

examiners yielded similar results. At each test period, the children were adminstered the Gesell developmental examination in the laboratory at UCLA (along with a complement of laboratory tasks). Within the same time period, they also were administered Bayley scales in their homes. All examiners were trained and experienced in the instruments. In all cases, parents, usually mothers, were present.

The Bayley scales and the Gesell Developmental Examination yielded similar information. Correlations between the two measures for each of the first four test periods are present in Table VI-19. The correlations offered here are interpreted as evidence of robustness of the process of infant assessment for evaluation of comtemporaneous functioning.

Stability of performance. The question of stability of developmental functioning of handicapped and delayed children has been argued for decades. In a recent chapter, Kopp and McCall (in press) review available data and suggest that stability begins to be seen for at risk and handicapped children by the second year of life. This is somewhat earlier than findings reported for normally developing samples.

Since the issue of stability has both theoretical and practical significance, it was important to examine stability with the longitudinal sample. The Gesell DQ scores were quite stable over time. Correlations of $r = .85$, $r = .87$ and $r = .96$ were achieved for Gesell DQ from time 1 to time 2, time 1 to time 3, and time 2 to time 3. Thus, within this sample of two year olds, the relative degree of stability in developmental status was extremely high.

However, within the context of high developmental stability, there were exceptions. Some children made dramatic developmental progress during the period of study, and a few showed little if any developmental advance. The relationship between entry and exit DQ score is depicted in Table VI-20. Reference to it reveals that using developmental level as an index and change in developmental level as a cross-index suggests nothing less than nine subgroups from the original 26 subjects. Moreover, the subgroups identified on the basis of developmental test score pattern over time are not homogeneous with respect to etiology. For example, the two children whose intake DQs were above 50 and who exited with DQs below 50 have two different etiologies, one suspected, one unknown; the five children whose intake and exit DQs were both in the 50-79 range are comprised of three with unknown etiologies and two with suspected etiologies.

Examination of Table VI-20 does suggest hypotheses about the course of developmental status. The three infants who entered with DQs between 80 and 94 and exited with DQs above 95, for example, are all girls who are at-risk for biologic conditions at birth or during the first year, and whose health improved and whose physical size grew, and this was followed by an increase in DQ scores. The three subjects in the adjacent cell, whose DQ scores were in the 80 to 94 range both at intake and at exit, are all boys who are similarly at biologic risk, but at risk that was not diminishing. One, for example, had cerebral palsy, the second had spina bifida, and the third continuing gastrointestinal problems.

Suspect versus unknown etiology. At the outset of this section, it was suggested that the 26 children included in the longitudinal study of infants

TABLE VI-19

Correlations Between Bayley Scale and Gesell Scores by Time, Infant Sample

	Mental age - Developmental age	MDI-DQ
Time 1	.77***	.83***
Time II	.94***	.92***
Time III	.89***	.91***
Time IV	.78	.76
	(n = 5)	(n = 5)

TABLE VI-20

Exit Gesell DQ

Initial Gesell DQ	<50	50-79	80-94	≥95	No Follow-up Test
<50	232.3	138S			146 S
50-79		131U		239U	135U
	140S	137U		133S	142S
	139U	141U	234U		
		144S			
		231S			
80-94			136S	132S	
			237K	143S	240U
			145S	236S	
≥95				233S	
				235S	238S
				134S	

U = unknown etiology
S = suspected etiology
K = known etiology

could be grouped along several dimensions, including etiology whether suspect, unknown, or known. One of the critical tasks of the type of longitudinal study conducted within Project REACH was to understand how designative variables relate to changes over time. Unless these designating variables offer insights and increase our understanding of developmental delay and of the nature of change in these infants, their application may be little more than the application of more labels to these children--whose parents will probably hear a dozen diagnostic labels before the children reach elementary school.

For this analysis we used a subsample of children whose DQ scores were below 85 at entry. Eight such children were identified whose delay was of suspect etiology (for example, seizures, RDS, microcephaly), and six were identified with unknown etiologies. At entry, the two groups did not differ in DQ (means were both in the mid-60s), nor were there outstanding differences in the two groups on the basis of exit DQ. Two children in the subsample had DQs that fell more than 10 points, to below 50; one was of unknown and one of suspect etiology. Three subjects had DQs that rose more than 12 points to above 85; two were of unknown and one of suspect etiology. While these results do not confirm the value of the labeling system, they are at odds with the pre-school data reported in the next section. As will be noted, there were differences on the basis of etiology and the amount of developmental progress which was observed.

Laboratory Developed Measures

A central focus of all of the infancy research with Project REACH has been development of two aspects of competence: sustained attention and self-control. The rationale and background for choosing these two aspects of competence are detailed elsewhere in this report. Cross-sectional findings of normally developing, Down syndrome, and developmentally delayed children, also reported elsewhere in this final report, indicate that the period from 18 to 30 months developmental age is a time of major growth and development in the ability to voluntarily sustain attention. Of particular interest in the longitudinal study has been the way in which disruptions in development in the children that have been followed longitudinally are mirrored and/or ameliorated by sustained attention.

During their semi-annual visits to the Project REACH infant laboratory, these children participated in a series of videotaped, structured, and unstructured activities designed to reflect their ability and inclination to become and to remain engaged in play and to exhibit self-control. Table VI-21 summarizes the measures that were derived from these videotapes, and on which the results to be described below are based.

Because the laboratory work was exploratory, we were simultaneously studying normally developing children at 12, 18, 24, and 30 months of age. For this reason, many of the analyses of the developmentally delayed infants are based on comparisons with normally developing children of similar developmental age. In order to do this, it was necessary to select the visit or visits in which the longitudinal delayed infants received developmental age scores that were similar to normally developing infants. For this reason, the results to be reported will be based on three time periods.

TABLE VI-21

Measures Used in Infant/Toddler Sample

I. Standardized developmental

- A. Gesell: overall developmental age
  - overall developmental quotient
  - five subscales: fine motor
    - gross motor
    - adaptive
    - language
    - personal-social

- B. Bayley Scales
  - Mental development index
  - Age equivalents

II. Laboratory observations

- A. Sustained attention
  - 1. duration scores
  - 2. content of play
  - 3. monitoring
  - 4. social-object orientation
  - 5. use of non-play time
  - 6. presence of anomalous play
  - 7. social interaction

- B. Self-control
  - 1. Delay (2 tasks)
    - a. latency
    - b. strategies
  - 2. Compliance
    - a. Child data (overall x specific behaviors)
    - b. maternal data (overall x specific behaviors)

III. Language measures

- A. SICD

- B. Verbal output during laboratory compliance task

IV. Additional child characteristics information

- A. Health history (maternal report)

- B. Child behavior in home (maternal report)

V. Family data

- A. Demographics

- B. Caldwell Home Scale

Sustained Attention

The major goals of the longitudinal investigation of sustained attention were to examine the duration of infant engagement in play, content of their play, and certain aspects of their orientation during play (e.g., ongoing appraisal of the larger environment and object/social orientation). The results reported here center on four particular issues: 1) the nature of sustained attention in this sample at entry, 2) the nature of sustained attention at exit, 3) individual variability and stability in sustained attention during the period in which infants were followed, and 4) suggestive relations between sustained attention and change in developmental status.

Sustained attention at entry. Table VI-22 summarizes the coding categories that were developed for the study of sustained attention at entry. As can be seen, the 360 seconds during which infants were videotaped with a bucket of toys were classified according to: a) the infant's engagement with the toys, with non-toy objects, with mother, or with nothing; b) content of play including holding, throwing, loading, manipulating and appropriate functional play; c) glances from the non-focal toys: d) object social orientation; and e) posture.

Results comparing the developmentally delayed infants (and in this case only those infants whose entry level DQ scores were below 85) with normally developing subjects equated for developmental age appear in Table VI-23. As can be seen, developmentally delayed infants/toddlers showed less sustained attention to toys, and spent less time occupied with non-toy objects than normally developing children. They also spent less time interacting with their mothers. By contrast, they spent their time in unengaged and unoccupied play, which generally took the form of aimless and repeated wandering around the laboratory space. In addition, the children showed less time than their normally developing counterparts holding, regarding, and examining toys. They also made fewer glances away from the toys with which they were playing to other objects in the room. Finally, as compared with normally developing children the delayed sample demonstrated less orientation toward objects. Notably, despite this finding, the children were not significantly more mobile or active than normally developing children.

We interpret these findings as evidence of disruption in the pattern of attention deployment among developmentally delayed young children. Normally developing children involved themselves in some form of occupation during virtually all of their play time, while delayed young children showed evidence of non-occupation or preoccupation. Normally developing children also monitored and appraised the environment during play, while the delayed children made fewer glances around the room. In fact, the data reported here suggest that developmentally delayed young children engaged in unoccupied, social oriented activity to the relative exclusion of attention to toys. The implications suggested here are paradoxical. On the one hand, delayed children showed many patterns of play that were outwardly similar to the normally developing sample. They engaged in functional and manipulative play, they oriented to objects and sustained attention throughout much of the test period. From another perspective, however, close examination of the play episodes revealed some fundamental distinctions between normally developing and delayed young children; for example, the absence of unoccupied activity, even when normally developing children are not engaged with toys,

TABLE VI-22

Coding Categories: Sustained Attention

A. Engagement (sums to 360 seconds)
   1. Sustained attention (engaged and occupied with toys)
   2. Unengaged with toys but occupied with an object (e.g., camera, own shoe)
   3. Unengaged with toys, but socially occupied (e.g., crawls on mother)
   4. Unengaged and unoccupied
   5. Unengaged, unclassified (e.g., fingers shoe and regards mother with little affect)

B. Content of play (coded only during Sustained Attention (e.g., Engagement = 1)
   1. Holds, regards, looks over
   2. Throws only (e.g., throws one toy after another)
   3. Loading only (e.g., loads and unloads bucket with no attention to items)
   4. Manipulates (e.g., dangles, moves)
   5. Appropriate functional play (e.g., feeds doll)

C. Number of glances from non-focal toy (duration of glance ≤ 3 seconds, and it must be followed by return to prior activity, coded only during Sustained Attention (e.g., Engagement = 1)
   1. Toward mother or examiner
   2. Toward non-focal toys or room (e.g., camera)

D. Object/social orientation (sums to 360 seconds)
   1. Orientation is totally or primarily object-directed (may glance at mother)
   2. Orientation is divided between objects and mother (e.g., offers toy), or is primarily or totally social
   3. N.A. (e.g., neither objects nor mother are attended to)

E. Postural
   1. Sits only
   2. Walks, crawls, lies, etc.
   3. Neither of above (e.g., moves from sit to stand)

TABLE VI-23

Means and Standard Deviations of Sustained Attention Measures

	Normally developing		Developmentally delayed	
A. Engagement	M	SD	M	SD
1. Sustained attention to toys	291.1	51.4	250.1	80.0*
2. Unengaged, occupied non-toy	23.5	34.3	1.4	3.5***
3. Unengaged, social	26.8	37.0	18.1	30.7**
4. Unengaged, unoccupied	8.4	17.1	81.9	78.7***
5. Unengaged, no predominant classification	9.4	20.9	7.9	20.0
B. Content of sustained attention				
1. Holds, regards, looks over	62.6	39.7	38.5	43.9**
2. Throwing	3.8	11.5	14.1	30.6
3. Loading	13.5	16.4	12.7	18.5
4. Manipulative	176.6	75.4	146.2	84.2
5. Functional	36.2	67.6	38.6	70.5
C. Glances from focal toys	18.5	10.2	10.6	7.9***
1. Social	10.1	6.1	7.4	5.4
2. Non-social	8.4	6.7	3.1	3.0***
D. Object/Social Orientation				
1. Total/primarily object	290.4	68.9	215.9	76.7***
2. Social orientation ≥ object	57.8	62.1	51.1	75.7
E. Postural				
1. Sits	194.6	126.6	217.5	120.1
2. Walks, crawls, stand	64.6	85.8	81.6	93.1

[a] Two tailed tests: **p* < .10; ***p* < .05; ****p* < .01

echoes the idea of a qualitative distinction in the amount and richness of learning that the normally developing child takes from or benefits from in free play.

The major findings of the entry level investigation related to differences in the duration of sustained attention and the pattern of behavior during non-engagement with toys, in the degree of object orientation, and in glances that signal monitoring and appraisal of the environment. Implications of these differences depended in part on their long-term effects. For this reason, we turned to examination of sustained attention at the conclusion of the two year study period.

Sustained attention at exit. In analyses to be reported here, 13 delayed subjects (including infants and a few preschoolers) were compared with 13 normally developing subjects of similar developmental age. No subject was included with a DQ score above 85. Tables VI-24, VI-25 and VI-26 summarize the results. As can be seen, at the time of exit, normally developing children's sustained attention had increased as had that of the index sample. The only significant difference to emerge on continuously scored variables was that normally developing children made more overtures to their mothers than delayed young children. Turning to Table VI-26, which summarizes the dichotomously scored variables, it is clear that the sample of developmentally delayed young children evidenced a greater number of problematic behaviors during free play, including throwing, repeatedly loading the bucket, regressive and repetitive activity. In fact, these results can be summarized quite easily. Sixty-two percent of the normally developing children had none of the problematic behaviors listed in Table VI-26. By contrast, 92% of the delayed young children had one or more of these behaviors in their play.

The striking differences in the pattern of play activities and attention to play between normally developing and delayed young children in this age range were not reflected in the amount of time that they devoted to play or in the number of functional appropriate toy actions in which they engaged. However, the pattern of diagnostic differences in qualitative aspects of play behavior did emerge. Early in the third year of life developmental age normally developing children did not engage in stereotypic, repetitive or regressive activity. They frequently initiated social engagement with their mothers, and they had little difficulty making a transition from one play situation to another. We interpret the presence of these behaviors in the delayed young children as a limitation in the ability to take advantage of the object and social resources available. At similar developmental ages we continued to see systematic and reliable differences in the behavioral repertoire.

Implications over time. Taken together, these studies offer a multifaceted picture of the developmentally delayed young child. On the one hand, when they are equated for overall developmental level with normally developing children, there are marked similarities in attention to and engagement in play activity, including the level, content and structure of play. This finding is consistent with the developmental interpretation of delay, articulated repeatedly by Zigler and associates.

On the other hand, the current findings reveal that similarity in some aspects of play does not imply similarity in all aspects of functioning. Nonredundant, spontaneous, flexible play appears to characterize development

TABLE VI-24

Coding Categories, Sustained Attention at Exit

Bucket Situation (6 minutes)

A. Engagement - (cumulative duration, sum = 360)
   1. Sustained attention: engagement with toys in bucket
   2. Unengaged witn toys/exploration of room: physical or visual examination of camera, lights, walls, curtain, exit barrier
   3. Unengaged with toys/social occupation: e.g., crawls on or converses with mother
   4. Unengaged with toys/unoccupied: e.g., stares into space, wanders aimlessly

B. Number of functional appropriate play actions (12 activities were defined *a priori*; they included: feeds doll, combs doll's hair, turns and looks at 3 or more pages in book, loads 2 items into truck)

C. Number of social overtures to mother. Overture was defined by the simultaneous occurrence of two or more of the following: looks at, approaches, touches, vocalizes to, shows

D. Throwing behavior: throws three or more toys in sequence without examining or manipulating

E. Loading activity: repeated performance of loading and unloading of the bucket with no attention to individual aspects of toys

Bucket and Basket Situation (16 minutes)

A. Transition to basket
   1. Immediate, enthusiastic shift to toys in basket
   2. Shift to toys in basket after more than 30 seconds, only with repeated maternal urging or never

B. Repetitive activity: repetition three or more times of a pretend act or sequence of acts, with variation or elaboration (e.g., child feeds self with cup, feeds doll with cup; feeds self; feeds doll; feeds self; feeds doll, or child "pours" from teapot into cup, drinks; pours, drinks; pours, drinks)

C. Stereotypic activity: performance of a single undifferentiated activity over and over for $\geq$ 30 seconds. The activity cannot be specific to the object; child's affect must be unanimated (e.g., banging or shaking the doll's neclace. Excluded: banging the hammer; rocking the doll)

D. Regressive activity: extremely low level behavior with an object or objects (e.g., indiscriminate mouthing, lying down with head down while massaging or rubbing a toy. Excluded: appropriate mouthing such as sucking doll's bottle)

TABLE VI-25

Means and Standard Deviations of Continuously Scored Variables at Exit

	Normally developing		Developmentally delayed	
	M	SD	M	SD
A. Engagement				
(Secs.)				
1. Sustained attention	315.8	43.4	286.9	60.9
2. Unengaged/explore	26.2	39.5	39.8	60.0
3. Unengaged/social	14.5	22.9	17.3	23.4
4. Unengaged/unoccupied	3.5	7.7	16.0	32.4
B. Functional play activities	4.08	1.4	2.92	2.2
C. Overtures to Mother	7.5	4.6	4.2	5.7**

**$p < .05$

TABLE VI-26

Proportion of Subjects Engaging in Target Activities

	Normally developing	Developmentally delayed
Overtures ≤ 3	.08	.36
Slow transition	.15	.23
Repetitive	.08	.15
Stereotypic	0	.31
Regressive	.15	.23
Loading	0	.15
Throwing	.23	.54

that is proceeding on course, not only in terms of order and sequence, but also in terms of time table. Findings of measurable differences between the normally developing and delayed samples may point to a wrinkle in the system. What remains to be determined is whether the wrinkle, in this case a differential pattern of attention allocation, has rippling affects. One interpretation of the pervasiveness of attentional difficulties among delayed infants is that they co-vary with prolongation of the developmental time table.

Evidence for this hypothesis can be drawn from examination of one subsample of four subjects whose DQ scores increased from entrance to exit. This group of ascenders may be considered a naturally occurring glimpse at the experimental relationship between attention and development. With the benefit of retrospect, at entry, the subsample of ascenders was distinguishable from other DD subjects in several ways. Their initial DQ scores, while clearly in the delayed range, were higher than many other delayed children. However, their attention performance might have been construed as less optimal. They sustained attention less, spent more time unoccupied and glanced up less often. Means for ascenders and stable DD subjects at entry were DQ (73 vs 64, $\underline{p} < .001$); sustained attention (226 vs 261, $\underline{p} = .12$); unoccupied activity (97 vs 76, $\underline{p} = .08$); and glances from focal toys (7.3 vs 11.9, $\underline{p} = .02$). At the time of exit this subsample had a mean DQ of 88.5. Their sustained attention by this point was extremely high, in fact significantly above the rest of the DD sample at exit. The occurrence of target activities (for example, regressive activity and throwing), however, was more like the DD than the ND sample. Three of the four ascenders had multiple (2) target activities (Fisher's exact test $p < .03$ for differences between ascenders and normally developing children). Thus, for this small group of ascenders, change in developmental status co-occurred with a major increase in sustained attention to toys. At developmental risk status, their pattern of target activities was not identical to that of their normally developing peers.

Stability of sustained attention. The final question to be addressed here was the relative stability within the entire sample of infants, those who were delayed as well as those who were biologically at-risk or developmentally at-risk. Discussion of the question of stability of attention has been postponed to this section because it raises a number of provocative questions. In our studies with more than 100 normally developing children, we have always found the measure of sustained attention during the 6 minutes of play with a bucket full of toys to be stable, week to week and month to month. In fact, in normally developing children, the correlation between sustained attention at 12 months and at 30 months was highly significant. By contrast, among the sample of delayed and at-risk infants, the relationship between attention at time 1, time 2 and time 3 was no different than 0, and in fact sometimes negatively signed. These findings, together with those reported above, raise some intriguing questings. Normally developing children show greater attention to toys at a younger developmental age than do delayed children. Developmentally delayed children who show marked improvements in their developmental levels show concomitant marked improvement in their attention to toys during play. However, DQ and attention to toys was not significantly related.

One possible explanation is that at an early age, delayed young children have difficulty focusing and sustaining attention, and over time, as a group, they show improvement, but some of them show greater improvements than others, and the degree of improvement in attention cannot be predicted from early attention. However, the degree of improvement in attention is related to the degree of improvement in developmental status. This last finding suggests a causal relationship between sustained attention during play and learning and development during the toddler period.

Overall Implications

In sum, in this study of developmentally delayed infants and toddlers, we attempted to describe their general characteristics, and to specify in detail one aspect of their cognitive functioning. To some extent, success was achieved in both endeavors, albeit we recognize that additional studies are necessary in order to understand more fully the ramifications of developmental delay (where the etiology is suspect or unknown). Many questions remain unanswered about these children.

In the following paragraphs we highlight some issues that are most salient to us. First, in generating the sample we found the children were quite diverse with respect to developmental attributes, neonatal stress, subsequent medical history, family characteristics and intervention histories. Although this diversity is not unusual in clinical research, it may mean that any given sample is not an accurate representation of a total diagnostic group. This impacts on the generalizability of the findings. Although it is important to determine sample representation, few investigators do so because of one or another constraint. In our case, we had no way of determining whether our sample was representative of developmentally delayed children in general, because these children have been rarely studied.

Heterogeneous samples have another disadvantage because they compromise the ability of investigators to make inferences. Often unmeasured and/or uncontrolled variables may influence the nature of findings (see Kopp & Krakow, in press, for discussion). As noted earlier, we attempted to overcome some of the problems related to sample heterogeneity by generating subgroups on the basis of developmental age, etiology, change of status, and so forth. Clearly our findings were more robust when the subsample sizes were adequate. At times we knowingly opted for small subgroups, fully cognizant of the problems related to small n's.

Another issue emerged over the health of our sample. By and large, the children were a sick group, far more than is usually encountered in children of similar age. While we do not fully understand the implications of poor health status, we suspect that extended periods of minor and major illnesses does not bode well for development in general. Sufficient data exist that implicate child ill health with apathy and limited interest in the object and social world; however, we do not know how much of our sample's development was influenced by poor health. We do believe, however, that the child's environment is a crucial factor in facilitating child interest in surrounding events. Thus it seems important for caregivers and intervenors to be especially cognizant of the implications of bouts of illnesses and to structure additional input to the child, as appropriate.

Another issue of importance concerns stability in cognitive functioning because this has ramifications for child, family and the educational system. Accordingly, we attempted to determine how the infants and toddlers in our sample fared in this respect. Unfortunately, our findings, obtained during a short time frame, revealed relatively little change in the children's developmental test scores. It was clear from the reports and records of parents and intervenors that some of the children in the sample had shown developmental improvement before entry into the study. Others who had similar neonatal stress did not, and entered and exited the study at about the same rate of development. We believe it is too soon to prognosticate outcome because much learning has yet to occur. Yet the vexing issue of our inability to specify stability and instability more fully remains. Innovative research is necessary and warranted in this area.

Finally, in studying the children's sustained attention, we were reminded again of the importance of studying diagnostic groups as separate entities. Clearly at times the developmentally delayed sample resembled normally developing children (e.g., overall on time); at other times they were similar to Down syndrome children (e.g., limited use of mother as a resource); and sometimes their behavior was unique to their own group (e.g., unoccupied, wandering in space). These findings have important ramifications for interventions that should be designed for children with developmental delays.

Child Characteristics: Preschool Sample

The preschool longitudinal sample was composed of 44 children (29 boys and 15 girls) who ranged in age from 25 to 42 months (mean = 33.8, SD = 3.7) at time of entry into the study. All children were Caucasian and from English-speaking homes. The socio-economic status (SES) of the sample was generally middle class. Mean level of maternal education was 13.4 years; mean level of paternal education was 14.5 years. Occupations of parents ranged from unskilled to professional, with 83% of the fathers holding skilled, managerial, or professional positions. All but five children were in intervention programs, and a number were receiving additional speech, physical, or occupational therapy.

Children and families were recruited through preschool programs and through pediatricians. All children had been identified as developmentally delayed, or at risk for developmental delay. Of the 29 children identified as delayed, 21 were of unknown etiology and 8 of uncertain or "suspect" etiology (e.g., prematurity, anoxia, cerebral hemorrhage shortly after birth). Range of identified conditions included cerebral palsy, motor delay, motor planning problem, hypotonia, aphasia, hyperactivity, mental retardation, and developmental delay. Twenty-two children were first borns, 16 second borns, 15 were only children. Age of parents at time of child birth ranged from 15 to 36 years for mothers (mean = 26, SD = 4.4) and from 20 to 40 years for fathers (mean = 29, SD = 4.7).

Health histories of the sample children suggested a high number of complications. Although the mean birthweight was 6.4 (SD = 2) pounds, the range was from 1.4 to 11.7 pounds. Twenty-three percent of the sample were pre-term. Additionally, many of the children had health difficulties in the first month of life: 59% had reported first month complications, and 45% did not leave the hospital with their mothers after the delivery. Parents also reported a relatively high number of hospitalizations and surgeries during the year immediately preceding the child's entry into the study: 32% were hospitalized during that period, and 27% had some kind of surgery. The impression, then, is that these children had a higher-than-average rate of physical problems in addition to their developmental delays.

At the time of entry into the project all children were assessed using standard developmental instruments (Gesell, SICD, Bayley, and in some cases, the McCarthy). The Caldwell Infant or Preschool Home Inventory was also administered at the time of entrance into the program and parents were asked to complete the short form (Keogh, Pullis, & Cadwell, 1979) of the Thomas and Chess Parent Temperament Questionnaire (TTQ).

Organization of Preschool Results

Group data for the 44 DD preschool children were analyzed in several ways: (1) To describe the developmental status of these children within each assessment period; (2) To determine the nature of change and/or stability over time; and (3) To relate the developmental findings to other child and situational influences. Following analysis of the group as a whole, the data were reorganized to consider possible differences in patterns according to the nature of the disability (i.e., developmental delay of unknown etiology or delay of uncertain or suspect etiology). The presentation of findings follows that organization. Selected data are currently being submitted to fine-grained analyses in order to test specific clinical hypotheses.

Developmental Status Within Assessment Periods

Findings from the first four assessment periods are summarized according to the relationships among major developmental scales within each test period (see Table VI-27). The strong relationships between the developmental scores on the Gesell and the Bayley within each assessment period are to be noted. Clearly these two tests tapped similar dimensions with considerable agreement. Examination of the analyses of data within each assessment period suggested similar patterns of results. Therefore, only the first assessment findings are described in detail in this report.

Results of first assessment. In an effort to provide more differentiated information about developmental status, the Bayley items were reorganized into five scales identified by Kohen-Raz (1967) and applied by Siegel (1981). These scales designate infant behavior according to various sub-abilities: eye/hand, manipulation, object relation, imitation-comprehension, vocalization-social. The Gesell scores were also cast into the five primary dimensions tapped by that scale: gross motor, fine motor, adaptability, language, and personal-social. Relationships amongst the Bayley subscales and the Gesell subscales are presented in Table VI-28.

It is clear from the correlation coefficients presented in Table VI-28 that there were strong relationships between the Gesell subscales and three of the five Kohen-Raz subscales of the Bayley. The dimensions tapping manipulation and object relations had consistently low correlations with the other scales on both the Bayley and the Gesell. Manipulation and object-relation scales both tap behaviors which are apparent early in the developmental process and are heavily weighted with items which emerge during the first year. Children in this sample ranged in age from 14 to 31 months mental age; thus, the manipulation and object-relation items tapped behaviors already achieved by these

Table VI-27

Relationships Among Developmental Scores in Four Assessment Periods

Time 1

	1	2	3	4	5	6
1. Bayley MA	--	.86*** (n=44)	.93*** (n=26)	.93*** (n=26)	.62* (n=16)	.58* (n=16)
2. Bayley MDI		--	.67*** (n=26)	.89*** (n=26)	.17 (n=16)	.50* (n=16)
3. Gesell DA			--	.90*** (n=26)	.78** (n=12)	.41 (n=12)
4. Gesell DQ				--	.72** (n=12)	.78** (n=12)
5. McCarthy MA					--	.87** (n=16)
6. McCarthy GCI						--

Time 2

	1	2	3	4	5	6
1. Bayley MA	--	.91*** (n=26)	.71*** (n=24)	.63*** (n=24)	.69 (n=7)	.55 (n=7)
2. Bayley MDI		--	.63*** (n=24)	.76*** (n=24)	.75* (n=7)	.90** (n=7)
3. Gesell DA			--	.89*** (n=40)	.40 (n=22)	.21 (n=22)
4. Gesell DQ				--	.35 (n=22)	.33 (n=22)
5. McCarthy MA					--	.84*** (n=22)
6. McCarthy GCI						--

Time 3

	1	2	3	4	5	6
1. Bayley MA	--	.95*** (n=14)	.62* (n=14)	.61* (n=14)	--	--
2. Bayley MDI		--	.49 (n=14)	.58* (n=14)	--	--
3. Gesell DA			--	.96*** (n=41)	.72*** (n=20)	.43 (n=20)
4. Gesell DQ				--	.77*** (n=20)	.64** (n=20)
5. McCarthy MA					--	.87*** (n=20)
6. McCarthy GCI						--

Time 4

	1	2	3	4	5	6
1. Bayley MA	--	.999*** (n=4)	.94 (n=4)	.96 (n=4)	--	--
2. Bayley MDI		--	.03 (n=4)	.94 (n=4)	--	--
3. Gesell DA			--	.97*** (n=24)	.71* (n=9)	.58 (n=9)
4. Gesell DQ				--	.55 (n=9)	.50 (n=9)
5. McCarthy MA					--	.95** (n=9)
6. McCarthy GCI						--

*p < .01; **p < .05; ***p < .001

Table VI-28

Bayley and Gesell Subscales, Time I

Variable	1	2	3	4	5	6	7	8	9	10
1. Bayley Eye-Hand	---	-.04 (n=44)	.12 (n=44)	.65*** (n=44)	.50** (n=44)	.70*** (n=26)	.73*** (n=26)	.64*** (n=43)	.61*** (n=27)	.57*** (n=43)
2. Bayley Manipulation		---	-.07 (n=44)	.11 (n=44)	-.08 (n=44)	-.01 (n=26)	-.09 (n=26)	-.07 (n=43)	.01 (n=27)	-.07 (n=43)
3. Bayley Object Relation			---	.11 (n=44)	-.18 (n=44)	-.11 (n=26)	-.02 (n=26)	.00 (n=43)	-.19 (n=27)	-.11 (n=43)
4. Bayley Imitation-Comprehension				---	.61*** (n=44)	.65*** (n=26)	.73*** (n=26)	.85*** (n=43)	.77*** (n=27)	.70*** (n=43)
5. Bayley Vocalization-Social					---	.73*** (n=26)	.63*** (n=26)	.60*** (n=43)	.80*** (n=27)	.73*** (n=43)
6. Gesell Gross Motor						---	.72*** (n=26)	.72*** (n=26)	.67*** (n=26)	.75*** (n=26)
7. Gesell Fine Motor							---	.77*** (n=26)	.73*** (n=26)	.72*** (n=26)
8. Gesell Adaptive								---	.79*** (n=27)	.81*** (n=43)
9. Gesell Language									---	.85*** (n=27)
10. Gesell Personal-Social										---

*p < .05
**p < .01
***p < .001

developmentally delayed youngsters. In contrast, the scales tapping eye/hand, imitation-comprehension, and vocalization were composed for the most part of items which were at or beyond the developmental age of these youngsters.

Interrelationships amongst the various language measures are summarized in Table VI-29. Correlations among the Kohen-Raz Bayley language scales, the expressive and receptive communication scores on the SICD, and the McCarthy scales were for the most part statistically significant. The Gesell personal-social scale, while not a direct index of language, contains many language items. The magnitude of the relationships amongst the various language scales is impressive and suggests that language competence may be assessed reliably for developmentally delayed children within this age group. A more differentiated approach to analysis of language items may be found in another section of this report (see analysis by Wilcoxen and Briggs in Documentation of Progress).

Taken as a whole, then, the assessments of preschool children at the time of entry into the project indicated that the developmental delay was represented in a number of dimensions or specific scales. There was also considerable agreement among the various scales, suggesting that development can be assessed reliably at this age.

Results of assessment periods two through five. As at Time 1, the relationships between the scores on the major developmental tests were high. For the most part relationships among the various subscales of the Gesell also were strong, and many of the Gesell subscales correlated significantly with the Kohen-Raz dimensions on the Bayley. Considering only the subscales which assessed language it was apparent that there continued to be considerable agreement among the various language measures within each assessment period. At assessment Time 2, as example, the Gesell language scores correlated .81 and .76 with the SICD ECA and RCA scores, respectively. The Gesell personal-social scores were also correlated .69 and .60 with the SICD expressive and receptive scores. At Time 3 the Bayley dimension tapping imitation/comprehension correlated .69, .67, .65 and .56 with the SICD expressive and receptive language scales and the Gesell language and personal-social scales, respectively. The SICD expressive and receptive scale were highly related also (*r* = .87). Further, examination of the intercorrelations among the Gesell subscales and the Kohen-Raz Bayley Scales at Time 3 suggested that the five Gesell scales continued to tap a broad ability factor, but that with increasing mental age, language became more salient in the developmental assessment. This was confirmed by the results of the final two assessments. The most notable finding in the fifth assessment period was the pattern of language abilities. Although the N was small (N=13), there was still a strong relationship between the SICD expressive and receptive language dimensions (*r* = .78). Both the SICD expressive and receptive scales were significantly correlated with the Gesell language and personal-social scores, values of *r* ranging from .60 to .93. The Gesell language score was correlated with the McCarthy mental age (*r* = .88, N = 6) as was the Gesell personal-social scale (*r* = .82, N = 7).

Table VI-29

Language Measures Time I

Variable	1	2	3	4	5	6	7	8
1. Bayley Imitation-Comprehension	---	.61*** (n=44)	.65*** (n=43)	.63*** (n=43)	.77*** (n=27)	.70*** (n=43)	.45 (n=16)	.31 (n=28)
2. Bayley Vocalization-Social		---	.70*** (n=43)	.41** (n=43)	.80*** (n=27)	.73*** (n=43)	.60* (n=16)	.40* (n=28)
3. SICD ECA			---	.78*** (n=42)	.87*** (n=26)	.77*** (n=42)	.87*** (n=16)	.36 (n=28)
4. SICD RCA				---	.71*** (n=27)	.60*** (n=42)	.77*** (n=16)	.17 (n=28)
5. Gesell Language					---	.85*** (n=27)	.94*** (n=12)	.43* (n=21)
6. Gesell Personal-Social						---	.62** (n=16)	.40* (n=28)
7. McCarthy Mental Age							---	.17 (n=13)
8. Caldwell Language								---

*p < .05
**p < .01
***p < .001

Analyses According to Developmental Age Groups

Because the range of children's ages within each assessment period was broad, it was possible that the values of the correlation coefficients had been spuriously raised due to chronological age effects. However, examination of the relationships among the index scores (DQ, MDI, and GCI) where chronological age was taken into account, also yielded high agreement among measures. At Time 1 the values of r were .82 between the Gesell DQ and the Bayley MDI (N = 26) and .78 between the Gesell DQ and the McCarthy GCI (N = 12); the Bayley MDI and the McCarthy GCI were correlated .50 (N = 16). Correlation coefficients between Gesell DQ and Bayley MDI were .76 at Time 2 (N = 24), and .58 at Time 3 (N = 14). The values of r were .90 between the Bayley MDI and the McCarthy GCI at Time 2 (N = 7); and, .64 between Gesell DQ and McCarthy GCI at Time 3 (N = 20).

Coefficients of correlation between chronological and mental age for the Bayley, Gesell, SICD, and McCarthy scales within each time period (see Table VI-30) suggested that there was considerable relationship between the Gesell mental age and chronological age for the preschool group as a whole, a finding confirmed by subscale analyses. The Bayley mental age was less related to chronological age and the SICD patterns varied according to expressive and receptive language. Because of the chronological age and developmental age relationships, the data were regrouped according to developmental age rather than according to assessment period. All children were grouped according to their 24, 30, 36, 42 and 48 month scores. For some children a particular DA grouping meant their first assessment, for others it might have represented the second or third. Thus, developmental age and assessment time are confounded. The relationships amongst the various Gesell scores according to developmental age for the six-month developmental age groupings are found in Table VI-31. From the correlation coefficients presented there it is clear that there were still a number of strong inter-relationships amongst the various Gesell subscales. It is also apparent that language was highly related to other developmental dimensions as tested on the Gesell.

Further support for the importance of language in the development of DD children was found in the relationships between the Gesell subscales and the Kohen-Raz dimensions of the Bayley. Of particular interest was the pattern of relationships within developmental age groups. The inverse relationship between language and motor skills appeared largely a function of the subset of cerebral palsy children within the sample. The overall point is that language abilities within this group of developmentally delayed children appeared to have increasingly strong relationships to other aspects of their competence. Further, examination of the patterns of language competence across the developmental age levels of children suggested that there was considerable consistency of measures within the language domain.

Table VI-32 contains a summary of the scores of the language subscales of the various developmental scales. For this analysis children were grouped according to developmental age on the Gesell. It is clear from the values of the correlation coefficients that there was strong agreement among the Gesell language, the receptive and expressive language scores of the SICD, and the vocalization-social and imitation-comprehension scores on the Bayley. There was some consistency of relationships over time, and, where there were changes they were for the most part reasonable and interpretable. As example, SICD receptive language is highly related to the Bayley items at 24

Table VI-30

Coefficients of Correlation Between Chronological Age and Developmental Age for Assessment Times

Measure	Time 1	Time 2	Time 3	Time 4	Time 5
Bayley CA-MA	.38* (n=44)	.22 (n=26)	.26 (n=14)	-.87 (n=4)	--
Gesell CA-DA	.56** (n=26)	.41** (n=40)	.55*** (n=41)	.51* (n=24)	.40 (n=14)
SICD CA-ECA	.39** (n=43)	.23 (n=41)	.18 (n=37)	.25 (n=24)	.26 (n=13)
CA-RCA	.27 (n=43)	.39* (n=41)	.24 (n=39)	.46* (n=24)	.48 (n=13)
McCarthy CA-MA	.52* (n=16)	.36 (n=22)	.23 (n=20)	.55 (n=9)	.53 (n=7)

*p < .05
**p < .01
***p < .001

Table VI-31

Relationships Among Gesell Subscales According to Developmental Age Groups

24 months (n=35)

	1	2	3	4	5	6
1. Gross M	--	.34*	-.29	-.29	.23	.54***
2. Fine M		--	.22	-.43*	-.11	.40*
3. Adaptive			--	.21	-.02	.35*
4. Language				--	.31	.34*
5. Pers-Soc.					--	.62***
6. DA						--

30 months (n=36)

	1	2	3	4	5	6
1. Gross M	--	.31	-.48**	-.81***	-.34*	.16
2. Fine M		--	.16	-.38*	.07	.65***
3. Adaptive			--	.59***	.27	.58***
4. Language				--	.40*	.13
5. Pers-Soc.					--	.48**
6. DA						--

36 months (n=23)

	1	2	3	4	5	6
1. Gross M	--	-.35	-.47*	-.41*	.09	.07
2. Fine M		--	.52*	-.10	-.39	.46*
3. Adaptive			--	.30	-.08	.61**
4. Language				--	.05	.28
5. Pers-Soc.					--	.32
6. DA						--

42 months (n=20)

	1	2	3	4	5	6
1. Gross M	--	-.13	-.62**	-.62**	.25	.08
2. Fine M		--	.12	-.13	-.51*	.26
3. Adaptive			--	.74***	-.03	.62**
4. Language				--	-.11	.49*
5. Pers-Soc.					--	.18
6. DA						--

*p < .05; **p < .01; ***p < .001

Table VI-32

Relationships Among Language Subscales According to Developmental Age Groups

24 months

		1	2	3	4	5	6	7
1.	Imit-Comp.	--	.45* (n=32)	.20 (n=30)	.55* (n=31)	.43* (n=32)	-.05 (n=32)	.20 (n=16)
2.	Voc-Soc.		--	.45* (n=30)	.56** (n=31)	.70*** (n=32)	.21 (n=32)	.06 (n=16)
3.	ECA			--	.33 (n=33)	.64*** (n=33)	.26 (n=33)	.44 (n=16)
4.	RCA				--	.49** (n=34)	.27 (n=34)	.16 (n=17)
5.	Gesell L					--	.31 (n=35)	.41 (n=18)
6.	Gesell PS						--	.78*** (n=18)
7.	Caldwell L							--

30 months

		1	2	3	4	5
1.	Imit-Comp.	--	.48* (n=19)	.56* (n=18)	.34 (n=19)	.52* (n=19)
2.	Voc-Soc.		--	.81*** (n=18)	-.11 (n=19)	.56* (n=19)
3.	ECA			--	.47** (n=34)	.79*** (n=34)
4.	RCA				--	.58*** (n=35)
5.	Gesell L					--
6.	Gesell PS					
7.	Caldwell L					
8.	McCarthy MA					

36 months

		1	2	3	4	5	6	7	8
1.	Imit-Comp.	--	-.49 (n=7)	.68 (n=6)	-.08 (n=6)	.89** (n=7)	.18 (n=7)	.36 (n=6)	.52 (n=7)
2.	Voc-Soc.		--	-.37 (n=6)	-.32 (n=6)	-.21 (n=7)	-.73 (n=7)	.40 (n=6)	-.78* (n=7)
3.	ECA			--	.55** (n=22)	.53* (n=22)	-.08 (n=22)	-.22 (n=12)	.77*** (n=15)
4.	RCA				--	.66*** (n=22)	-.14 (n=22)	.02 (n=12)	.80*** (n=15)
5.	Gesell L					--	.05 (n=23)	.45 (n=13)	.70** (n=16)
6.	Gesell PS						--	.26 (n=13)	-.29 (n=16)
7.	Caldwell L							--	-.40 (n=9)
8.	McCarthy MA								--

42 months

		1	2	3	4	5
1.	Imit-Comp.	--				
2.	Voc-Soc.		--			
3.	ECA			--	.78*** (n=20)	.77*** (n=20)
4.	RCA				--	.71*** (n=20)
5.	Gesell L					--
6.	Gesell PS					
7.	Caldwell L					
8.	McCarthy MA					

*p < .05; **p < .01; ***p < .001

months, whereas at 30 months there were moderate to high correlations between the Bayley items and the SICD expressive language. Beyond 30 months there were increasingly strong relationships between the receptive and expressive language scores on the SICD and strong relationships with the McCarthy mental age. In short, there was substantial evidence to suggest that the language subscales of the different developmental tests tapped in common the language competence of developmentally delayed children. For the most part the relationships amongst the scores were reasonably high and the patterns of change were interpretable. As these correlations were based on the sample organized according to developmental age, the effect of chronological age was accounted for, and age could not explain the consistently high relationships among the various measures.

Summary of Assessment and Developmental Age Group Findings

The size of the correlations among the various developmental tests lend support to their reliability in assessing handicapped children within this developmental age range. The particular problems in the use of the scales for children with limited language is to be emphasized, however. This was especially apparent with the McCarthy scale, where, as noted earlier, the items were apparently too difficult for many children. As the McCarthy presumably provides a continuous "extension" of the Bayley, the inability of many of the children who topped out on the Bayley to perform minimumly on the McCarthy deserves note. Apparently for developmentally delayed children whose delays in the language area are relatively severe, the McCarthy-Bayley continuum is to be questioned.

Although chronological age has been shown to have an important relationship to performance on the standard developmental measures for developmentally delayed children, it was also clear from our data that developmental age varied somewhat independently from CA. When chronological age was taken into account, as in the index scores on developmental tests (DQ, MDI, GCI), there was strong agreement among the various developmental tests.

In addition to the overall agreement amongst the various developmental scales the high relationships of the various subscales of the Gesell and of the Bayley (Kohen-Raz dimensions) are also to be emphasized. When the fine motor and gross motor items were excluded relationships between all other Bayley Kohen-Raz scales were strong. The five subscales of the Gesell were also highly intercorrelated. Several possible interpretations of the interscale relationships are to be considered. First, it may be that the scales in fact represent one broad ability factor; that is, while given names which have meaning on a construct level (i.e., fine motor, adaptive, personal/social), for developmentally delayed children these various ability domains may not be well differentiated and, thus, the tests measure one global ability factor. Said differently, it is possible that developmental delay is not specific, but rather affects most major ability dimensions. In this case, one would expect high relationships among performance across subscales as is evidenced in the present data.

A second, related hypothesis is that language is a powerful mediator, and where children have significant delays in language, as in the case of most of the children in the preschool sample, there is apt to be a consequent negative impact on other developmental dimensions. Our data provide some tentative support for this hypothesis in that the children who made the most overall gain during the study period had change scores on the Gesell language subscale which were greater than the corresponding changes in chronological age (e.g., 31 months progress in 24 months time).

Finally, another possible interpretation relates to the confounding of measurement and actual ability. It is possible that the developmental tests which were used for assessing these DD children were not powerful enough to yield differentiated results. Despite their wide use in developmental testing, the techniques still provide rather gross estimates of children's abilities; where there are significant delays in a number of developmental dimensions the tests may not reflect these differences.

Stability and Change Over Time

Having established that there was considerable within assessment period agreement among the various measures in estimates of developmental status, and that many of the subscales of the developmental tests were highly interrelated, the data were reanalyzed to consider the relative stability of scores over time. It should be remembered that the preschool sample children entered at different times during the course of the study; their chronological ages at study entrance also varied (CA range 25 to 42 months). Thus, specific tests were not appropriate for all children at all time periods, and the subject numbers varied according to test period and according to specific test (i.e., Gesell, McCarthy).

Major findings are summarized in Table VI-33. As the age range within any one assessment period was broad, it was likely that the high correlation coefficients reflected in part the influence of CA, and the stability of scores, therefore, overestimated. However, the Gesell DQ, the Bayley MDI, and the McCarthy GCI were indices in which CA had been taken into account. The largest number of children were tested with the Gesell. Based on scores for the group as a whole, the degree of stability of Gesell DQ over time was striking; when the subjects were grouped according to 30, 36, or 42 months entry ages to account for the possible CA effects, the relationship of Gesell DQs across assessment periods continued to be strong and statistically significant. The across test relationships for the SICD expressive language scores were substantially higher for the older entry children (42 months) than for the younger entry children (30 months). Taken as a whole, however, the strength of the relationships of developmental test scores over time suggests that there was some consistency in the rate of growth during the three year period.

It should be emphasized that when age scaled items provided the basis for estimating developmental status, it was clear that children within the preschool sample made progress (see Table VI-34), almost all children showing changes and growth between any two test periods. There was a great deal of variability, however, in the amount of change. Children were given the Gesell either three, four, or five times, depending upon their date of entry into the study. Thus, children seen five times were followed for 24 months. In this group, the average amount of change was 18 months, but the range of change was from 6 to 30 months. The average amount of change for children seen four times over an 18-month period was 13 months, with a range from 11 to 18. For children followed for 12 months, the average amount of change was 10 months, with a range of change from 4 to 20 months.

Table VI-33

Correlation Coefficients for Major Developmental Tests Across Assessment Periods

Developmental Test	Assessment Periods									
	1-2	1-3	1-4	1-5	2-3	2-4	2-5	3-4	3-5	4-5
Gesell	N=25	N=24	N=7	N=13	N=38	N=22	N=12	N=24	N=14	N=14
DA	.95***	.92***	.96***	--	.95***	.88***	.77***	.94***	.87***	.97***
DQ	.87***	.89***	.94**	--	.83***	.85***	.76***	.92***	.87***	.97***
GM	.92***	.95***	.94**	--	.95***	.90***	.82***	.90***	.89***	.95***
FM	.79***	.76***	.75	--	.84***	.61**	.65*	.87***	.81***	.89***
Adapt.	.89***	.89*** (n=23)	.83*** (n=23)	.64*	.92*** (n=40)	.83*** (n=24)	.80*** (n=14)	.95***	.92***	.97***
Lang.	.89***	.89*** (n=25)	.96*** (n=8)	--	.90***	.85***	.75**	.93***	.84***	.92***
P-S	.88***	.84*** (n=23)	.64*** (n=23)	.60*	.91*** (n=40)	.82*** (n=24)	.76** (n=14)	.83***	.84***	.75***
SICD	N=40	N=37	N=23	N=13	N=36	N=23	N=13	N=21	N=12	N=13
ECA	.75***	.68***	.53**	.22	.76***	.68***	.70**	.81***	.88***	.83***
RCA	.81***	.78*** (n=38)	.65***	.59* (n=12)	.84*** (n=37)	.65***	.75** (n=12)	.78*** (n=22)	.89***	.90***
McCarthy	N=15	N=12	N=6	N=3	N=17	N=9	N=5	N=8	N=5	N=5
MA	.79***	.82***	.67	.63	.67**	.57	.41	.75*	.76**	.51
GCI	.83***	.55	.29	-.02	.78***	.56	.27	.60	.90	.20
Bayley	N=14	N=4			N=12	N=3		N=5		
MA	.47	.70	--	--	.52	.98	--	.95	--	--
MDI	.43	.76	--	--	.50	.98	--	.96	--	--

*p < .05
**p < .01
***p < .001

Table VI-34

Means and Standard Deviations for Total Sample and by Sex According to Assessment Period

Measure	Time I			Time II		
	Mean	SD	N	Mean	SD	N
Gesell DA	25.0	6.8	26	29.7	7.6	40
M	26.4	7.3	18	30.2	8.1	26
F	21.9	4.4	8	28.8	6.6	14
Gesell DQ	74.0	16.9	26	72.6	16.9	40
M	75.9	16.8	18	73.9	17.4	26
F	69.7	17.4	8	70.3	16.5	14
Gesell GM	26.3	8.9	26	29.5	9.3	40
M	28.6	9.6	18	31.2	10.2	26
F	21.0	3.5	8	26.3	6.5	14
Gesell FM	25.3	7.8	26	28.7	8.8	40
M	26.5	8.1	18	29.5	9.4	26
F	22.5	6.9	8	27.2	7.7	14
Gesell Adapt.	24.9	6.1	43	30.2	8.2	42
M	24.8	6.3	29	30.7	8.0	27
F	25.0	6.0	14	29.4	8.8	15
Gesell Lang.	21.5	6.3	27	27.9	8.9	40
M	22.7	6.3	18	27.5	8.3	26
F	19.2	5.9	9	28.7	10.0	14
Gesell P-S	25.3	7.2	43	31.2	8.3	42
M	25.9	8.0	29	31.5	8.7	27
F	24.2	5.2	14	30.6	7.6	15
ECA	20.4	7.3	43	24.1	8.0	41
M	20.6	6.9	28	23.8	7.5	26
F	20.0	8.3	15	24.5	9.0	15
RCA	23.1	5.6	43	26.8	6.9	41
M	22.1	4.8	28	26.0	6.0	26
F	24.8	6.8	15	28.2	8.2	15
McCarthy MA	28.0	6.2	16	32.2	6.9	22
M	26.6	5.4	11	30.8	5.5	15
F	31.0	7.4	5	35.3	8.8	7
McCarthy GCI	78.3	14.7	16	79.1	15.9	22
M	73.2	12.4	11	73.5	10.4	15
F	89.6	13.9	5	91.1	19.5	7

Table VI-34 (Con't.)

Measure	Time III			Time IV		
	Mean	SD	N	Mean	SD	N
Gesell DA	33.6	9.4	41	36.1	9.2	24
M	34.2	10.0	26	35.7	8.7	16
F	32.6	8.7	15	37.0	10.5	8
Gesell DQ	72.3	17.7	41	69.0	15.5	24
M	72.6	17.7	26	68.2	15.3	16
F	71.9	18.4	15	70.7	17.1	8
Gesell GM	32.8	11.0	41	34.2	11.6	24
M	34.2	12.2	26	34.9	12.2	16
F	30.3	8.5	15	32.9	10.8	8
Gesell FM	32.9	10.8	41	35.1	11.5	24
M	34.0	11.2	26	35.7	10.2	16
F	31.1	10.1	15	33.9	14.6	8
Gesell Adapt.	34.6	10.2	41	36.4	9.3	24
M	35.1	10.1	26	35.3	8.6	16
F	33.7	10.5	15	38.5	10.8	8
Gesell Lang.	32.3	11.1	41	35.9	11.3	24
M	31.8	11.0	26	33.5	10.7	16
F	33.3	11.6	15	40.7	11.7	8
Gesell P-S	35.5	8.7	41	38.7	8.9	24
M	36.2	9.2	26	38.4	8.9	16
F	34.4	8.1	15	39.4	9.4	8
ECA	29.6	9.9	37	30.3	9.4	24
M	28.5	9.7	24	29.4	10.3	17
F	31.8	10.1	13	32.6	7.1	7
RCA	30.7	7.5	39	32.2	8.2	24
M	30.1	7.0	25	31.3	8.5	17
F	31.8	8.5	14	34.3	7.6	7
McCarthy MA	34.7	7.3	20	42.7	9.3	9
M	33.9	7.1	14	41.0	8.5	5
F	36.7	7.9	6	44.7	11.2	4
McCarthy GCI	74.9	16.9	20	79.3	16.7	9
M	71.9	13.7	14	78.0	15.4	5
F	82.0	22.6	6	81.0	20.5	4

Table VI-34 (Con't.)

	Time V		
	Mean	SD	N
Gesell DA	39.1	10.4	14
M	38.9	10.2	9
F	39.6	10.9	5
Gesell DQ	67.1	17.0	14
M	67.0	18.0	9
F	67.4	17.2	5
Gesell GM	35.3	13.1	14
M	35.4	14.1	9
F	35.0	12.8	5
Gesell FM	36.6	12.6	14
M	36.5	11.7	9
F	36.8	15.5	5
Gesell Adapt.	40.2	12.4	14
M	40.2	12.8	9
F	40.2	13.2	5
Gesell Lang.	41.6	12.2	14
M	40.2	13.2	9
F	44.0	11.0	5
Gesell P-S	42.0	12.0	14
M	41.8	12.7	9
F	42.4	12.0	5
ECA		32.9	9.5
M	33.6	10.9	10
F	30.7	2.3	3
RCA		32.6	9.3
M	32.0	10.0	10
F	34.7	8.3	3
McCarthy MA	43.4	10.0	7
M	41.6	10.8	5
F	48.0	8.5	2
McCarthy GCI	75.7	16.2	7
M	74.4	19.4	5
F	79.0	7.1	2

Table VI-34 (Con't.)

Means and Standard Deviations for Total Sample and by Sex According to Assessment Period

Measure	Time I			Time II		
	Mean	SD	N	Mean	SD	N
Bayley CA	33.8	3.7	44	38.7	3.1	28
M	34.2	3.9	29	38.7	3.3	17
F	33.0	3.5	15	38.6	2.9	11
Bayley Basal	128.2	16.7	44	129.9	15.2	26
M	129.2	17.1	29	129.3	13.6	15
F	126.5	16.3	15	130.9	17.9	11
Bayley Ceiling	152.3	13.6	44	154.8	11.4	27
M	152.0	14.8	29	152.9	13.8	16
F	152.9	11.5	15	157.5	6.1	11
Bayley Raw	141.2	14.8	44	144.2	13.2	26
M	142.1	15.3	29	143.4	14.4	15
F	139.5	14.3	15	145.3	12.1	11
Bayley Eye-Hand	16.4	1.7	44	17.6	1.4	28
M	16.8	1.6	29	17.7	1.3	17
F	15.7	1.8	15	17.4	1.7	11
Bayley Manip.	8.0	.1	44	8.0	.0	28
M	8.0	.2	29	8.0	.0	17
F	8.0	.0	15	8.0	.0	11
Bayley OR	8.2	.4	44	8.2	.4	28
M	8.2	.4	29	8.2	.4	17
F	8.1	.3	15	8.3	.5	11
Bayley Imit-Comp.	12.9	3.0	44	13.2	3.3	28
M	13.2	3.0	29	12.8	3.4	17
F	12.5	3.1	15	13.8	3.0	11
Bayley Voc-Soc.	9.9	1.9	44	10.3	2.4	28
M	10.1	2.0	29	9.9	2.3	17
F	9.7	1.7	15	11.0	2.4	11
Bayley MA	23.1	5.1	44	24.5	5.0	26
M	23.3	5.2	29	24.2	5.1	15
F	22.6	4.9	15	24.9	5.0	11
Bayley MDI	68.6	15.2	44	63.3	13.3	26
M	68.4	14.9	29	69.0	16.1	15
F	62.2	13.0	15	64.8	14.2	11

Table VI-34 (Con't.)

Mean Scores for Total Sample and by Sex

Measure	Time III			Time IV		
	Mean	SD	N	Mean	SD	N
Bayley CA	44.8	2.8	15	48.4	.9	5
M	44.9	3.1	10	48.7	.6	3
F	44.6	2.4	5	48.0	1.4	2
Bayley Basal	131.8	16.8	15	129.6	15.9	5
M	134.4	18.3	10	124.7	3.5	3
F	125.2	11.9	4	137.0	28.3	2
Bayley Ceiling	154.0	12.2	15	153.0	10.8	4
M	152.9	14.3	10	146.5	13.4	2
F	156.7	3.4	4	159.5	.7	2
Bayley Raw	1444.1	14.0	15	140.5	13.8	4
M	144.3	16.4	10	131.0	7.1	2
F	143.5	7.2	4	150.0	12.7	2
Bayley Eye-Hand	17.7	1.7	15	17.4	2.1	5
M	18.2	1.6	10	18.0	1.0	3
F	16.8	1.6	5	16.5	3.5	2
Bayley Manip.	8.0	0	15	8.0	0	5
M	8.0	0	10	8.0	0	3
F	8.0	0	5	8.0	0	2
Bayley OR	8.4	.5	15	8.4	.5	5
M	8.4	.5	10	8.3	.6	3
F	8.4	.5	5	8.5	.7	2
Bayley Imit-Comp.	13.7	2.7	15	11.6	3.3	5
M	13.5	3.2	10	9.3	1.1	3
F	14.0	1.6	5	15.0	1.4	2
Bayley Voc-Soc.	10.2	2.3	15	10.4	2.1	5
M	10.6	2.5	10	9.0	1.0	3
F	9.4	1.8	5	12.5	.7	2
Bayley MA	24.4	5.2	14	23.0	5.6	4
M	25.0	6.0	10	19.5	2.1	2
F	23.0	2.4	4	26.5	6.4	2
Bayley MDI	54.5	11.3	14	47.8	12.6	4
M	55.6	12.7	10	40.2	5.0	2
F	51.6	6.9	4	55.4	14.9	2

Examination of the Gesell subtest patterns was of interest. As a group, the children made the most progress in language and the least progress in gross motor abilities over time, although it should be noted that gross motor was the highest group score upon entry, while language was the lowest group score. The personal-social subscale yielded the highest group score at the end of the study. The personal-social items are based entirely upon information supplied by parents and not upon the child's performances during the test situation. Thus, these scores may be more or less accurate than scores yielded by some of the other subscales on the basis of children's performances during a test.

The consistently slow development in the language area was reflected in many of the tests, as shown in Table VI-34. However, the rate is well summarized in the expressive and receptive scores of the SICD, the ECA changing 12.5 months, the RCA changing 9.5 months during the 24 month period.

From both the developmentally scaled item scores and from the correlations of scores over time, it is reasonable to conclude that as a group, the children in the longitudinal study tended to show stability over time: children who were delayed at two or three years of age were likely to be delayed when they were four or five. However, it was not possible to make predictions for individual children with confidence, at least on the basis of single test sessions. Some children made rapid progress, having change scores which were greater than the changes in their chronological ages. Others maintained remarkable stability, and a few showed patterns of declining scores. Future analyses will be directed at more careful analysis of the "changers." Within this sample we cannot explain the different rates of development in terms of the home environments, which were uniformly positive. Areas to be explored, thus, include the role played by language development, etiologic factors, and the presence or absence of behavior problems.

Home and Child Influences

In addition to detailed study of developmental status of children, REACH researchers were interested in selected child and situational influences which might affect growth. Home environment and children's temperament were studied in this regard.

Home environment. The Caldwell Home Stimulation Scales (Infant and Preschool Forms) were used to provide a quantitative description of home environments. At the time of the first assessment there were for the most part low magnitude relationships between the Caldwell dimensions and the developmental status of children as tested on the Bayley, Gesell, or McCarthy tests (see Table VI-35). However, the Caldwell Language Stimulation was positively associated with several of the language measures, particularly the Bayley vocalization-social scale and the Gesell language and personal-social scales (see Table VI-29).

At assessment period three, one year later, the Caldwell Language Scale was nonsignificantly associated with the receptive language measure on the SICD and only moderately related to the expressive scale ($\underline{r} = .43$). The Caldwell Language Scale was, however, related significantly to the Gesell language and personal-social subscales ($\underline{r} = .40$ and $.46$).

Table VI-35

Relationships Between Developmental Age Estimates and Preschool Home Inventory Scales According to Assessment Period

Developmental Measure	N	Caldwell Stim. (Toys)	Caldwell Language	Caldwell Academic	Caldwell Stim. (Variety)
Bayley MA					
Time 1	28	-.37*	.20	.06	.05
Time 3	11	-.26	.16	.18	-.35
Time 4	1	--	--	--	--
Time 5	2	--	--	--	--
Gesell DA					
Time 1	21	-.27	.42	.13	.18
Time 3	32	.05	.28	.38*	.01
Time 4	6	-.19	-.33	.25	-.01
Time 5	13	-.15	.60*	.22	.41
McCarthy MA					
Time 1	13	.01	.17	.29	-.35
Time 3	17	-.21	.26	.35	.17
Time 4	3	.86	.00	.50	.76
Time 5	7	.25	-.38	.32	-.27

*p < .05
**p < .01
***p < .001

At the fourth assessment there was no significant relationship between the measures of developmental status and any of the four subscales of the Caldwell Home Inventory, including the Language Stimulation dimension. It should be noted however, that some of the correlations were reasonably high ($\underline{r}$ = .76 for McCarthy and Variety of Stimulation, and .86 for McCarthy and Stimulation Toys) but the N's were small and, thus, none of the coefficients reached statistical significance.

The pattern shifted somewhat at the final test period where the Gesell language and personal-social scales were significantly correlated to the Caldwell Language Stimulation scale ($\underline{r}$ = .58, .69, N = 13). Two Caldwell scales were significantly related to developmental scores at this final testing period: the Language Stimulation to the Gesell DA ($\underline{r}$ = .60, N = 13), and Variety of Stimulation to the SICD expressive score ($\underline{r}$ = .63, n = 12).

The generally low relationships between the Home Stimulation Scale and some of the developmental scores is especially to be noted. A possible interpretation of this finding is that the homogeneity of the sample minimized or washed out within-group variance in home stimulation. These were middle class, Anglo, English-speaking families; all had children with identified delays in development; and, most children were in some type of intervention program. Given the generally high quality of homes, the Caldwell Preschool Inventory may have not been powerful enough to differentiate within this group, at least in relation to the major tests of developmental status. Where patterns of relationships were evident, however, they tended to cluster about the language dimensions.

Temperament. While not falling clearly into the three patterns described by Thomas and Chess (Thomas & Chess, 1977), the consistent relationships among mood, intensity, adaptability, and approach/withdrawal suggested a pattern of child attributes which were identifiable by parents and which may have been part of the parent-child interaction.

To investigate the interpretation the temperament characteristics were examined in relation to the Caldwell Home Scales. Few direct relationships between the character of the home environment and the children's performance were found. There were, however, some identifiable relationships between children's temperament patterns and certain dimensions of parent/ child interaction, particularly the interactions relating to restrictions and punishment. The pattern evidenced upon entry in the study was generally consistent across the full time of the study. At Time 1, relationships within the Caldwell Infant Scale were generally high but only a few dimensions were significantly related to children's temperament. The temperament dimensions of intensity and persistence yielded the highest relationships to home characteristics. This is not surprising given that children's characteristics of intensity and persistence are likely to interact, possibly conflict, with parents' views on restrictions and on punishment. The values of $\underline{r}$ between intensity and persistence and infant punishment are particularly to be noted (-.63 and -.70); intensity was also significantly and negatively related to temperament dimensions of adaptability and mood. Further, distractibility, intensity, adaptability, and mood clustered together in meaningful ways, particularly when this cluster was put against the home characteristics which relate to punishment and restriction.

When the children's temperament patterns were examined relative to the findings from the Preschool Home Inventory, the nature of the relationships was confirmed; that is, there were significant relationships amongst adaptability, mood, intensity, and distractibility. Approach/withdrawal was also related to adaptability and was the only temperament dimension which yielded significant relationships to the Caldwell dimensions, values of $\underline{r}$ -.52 and -.61 for the Caldwell Punishment and Language Stimulation scales, respectively. Intensity, a significant correlate of the infant Caldwell dimensions was again negatively, but for the most part nonsignificantly, related to the preschool Caldwell dimensions.

At age 24 months the temperament intensity dimension was significantly and negatively related to the Caldwell Home Stimulation and Maturity scores ($\underline{r}$ = -.67 and -.56). Intensity and approach/withdrawal were negatively and significantly related to the Language Scale on the Caldwell at 30 months; distractibility was also negatively related to the Punishment Scales. The pattern of scores at 36 months was less clear but by 42 months the importance of the distractibility characteristic became stronger, distractibility being related significantly and negatively to the Caldwell Stimulation, Maturity, and Punishment scales. Again, the cluster of characteristics of approach/withdrawal, adaptability, and mood had high relationships with environmental characteristics as defined by the Caldwell.

Taken as a whole, the temperament findings suggest that selected patterns of child attributes relate to the amount and kind of interactions children have with their environments. In particular, the intense, withdrawing, negative, and distractible child appears to have somewhat negative interactions with those in his environment. Of particular interest in regard to language was the finding that at 30 months there was a negative relationship between Language Stimulation and the temperament characteristics of approach/withdrawal and intensity. Apparently parents made a reasonable and common sense response to their children; that is, there was more interaction with children who tended to be withdrawing and to be low in response intensity, a finding compatible with the lower limit control notion proposed by Bell (1977). Parents apparently had to work particularly forcefully to stimulate active language interaction from these children. There was, thus, some evidence for the impact of children's temperament on the nature of their parents' responses.

Parents' perception of problems. Finally, at entry and again at exit parents were asked about the areas they perceived as being problems. Here, too, there was stability for the group as a whole. Findings are summarized in Table VI-36. Physical/motor development and speech and language problems were mentioned with great frequency at both entry and at exit; there was a slight decrease in physical problems and a slight increase in speech and language problems over time. More noticeable changes occurred in terms of medical, behavioral, and emotional problems; medical problems became much less common (from 24% to 5%) while both behavioral and emotional problems increased in frequency (behavior 17% to 33%; emotional 3% to 18%). It should be noted that only 2% of parents at entry and exit indicated that there were no problems.

Table VI-36

Percent Children Perceived as Having Problems at Entry and Exit

Entry (N=44)	Problem	Exit (N=40)
61%	Physical	56%
59%	Speech/Language	69%
34%	Learning	36%
25%	Behavioral	36%
20%	Medical	5%
14%	Retardation	20%
11%	Maturational	10%
11%	Hearing	5%
7%[a]	Other	2%[b]
2%	Emotional	23%
2%	None	2%

[a] "developmental delay;" "neurologically handicapped"

[b] "over-all behind"

Diagnostic Subgroups: Etiology

There were two groups of developmentally delayed children in the preschool sample: delay of unknown etiology (n = 21), and delay of uncertain or "suspect" etiology (n = 8). All of the children in the second group had been subjected to some known type of perinatal stress: premature birth, anoxia, cerebral hemorrhage shortly after birth. Kopp (in press) has noted differences between the two groups in terms of outcome, suggesting that prognosis is better for children subjected to stress in the perinatal period than it is for children who sustain injury in the prenatal period. Hence the mean scores on the Gesell and SICD scales were examined for the two subgroups across assessment periods. These data may be found in Table VI-37.

For both groups, the developmental ages on the Gesell and SICD increased steadily over the two-year period. The two groups were comparable at Time 2 (DQ 63.2 for the unknown group and 61.6 for the suspect group). The greatest difference was found in the language scores in favor of the suspect group. At Time 5, however, differences between the two groups were readily observable. Despite the same mean CA on the Gesell (58.5 months), the DD suspect group scored consistently higher on all five subscales, surpassing the DD unknown group by amounts ranging from five months (gross motor) to 14 months (adaptive). The DQ for the suspect group, which at Time 2 was less than one standard deviation from the DQ for the unknown group was well over one standard deviation higher upon exit.

Rate of change, then, appeared to be a distinguishing factor for these two groups of children. There were other distinguishing factors as well. More of the DD unknown group had significant behavior problems as reported by parents (40%); only one child in the suspect group was reported to have a behavior problem. Not surprisingly, a larger percentage of the parents in the suspect group described their situation as having become easier in the past two years. One parent felt there had been no change in terms of difficulty, but no parent reported that their situation had become harder in terms of their child. In the unknown etiology group, however, 35% of the parents felt that their situation had become more difficult over time. There were two reasons most commonly cited: increased problems with behavior, and the parents' gradual realization that their children were unlikely to "catch up."

Exceptions existed within each of these groups in terms of change over time. One child in the suspect group entered with a DQ of 45; his DQ was 38 at the end of the two-year period. A child in the DD unknown group entered with a DQ of 70, and had a DQ of 81 upon exit. Thus despite apparent group trends according to etiology, it was again not possible to make predictions for individual children.

Family Needs and Stresses Over Time

Common sense as well as some tentative research evidence suggest that stresses vary by type of handicapping condition. A more popular assumption, however, is that families with handicapped children share similar needs. Experience with the parents in the longitudinal study suggests that needs do vary according to child characteristics and also with the passage of time.

Table VI-37

Means, Standard Deviations, and Ranges of Scores on Gesell and SICD DD Unknown and DD Suspect, Times II and V

	Time II				Time V			
Measure	Mean	SD	Range	n	Mean	SD	Range	n
GESELL CA								
Unknown	40.1	(2.8)	36-46	20	58.6	(3.9)	54-64	7
Suspect	39.7	(3.3)	37-46	7	58.5	(3.3)	56-64	6
GESELL GM								
Unknown	25.6	(5.6)	14-34	18	32.1	(10.9)	16-48	7
Suspect	24.0	(9.5)	8-34	7	37.2	(16.2)	12-51	6
GESELL FM								
Unknown	25.1	(4.1)	18-30	18	31.8	(7.7)	20-42	7
Suspect	22.3	(5.2)	15-29	7	42.3	(16.4)	20-60	6
GESELL A								
Unknown	25.6	(4.1)	16-32	20	33.3	(7.8)	23-44	7
Suspect	26.1	(8.2)	17-33	7	47.3	(13.9)	22-58	6
GESELL L								
Unknown	22.6	(3.0)	16-27	18	35.4	(7.2)	21-44	7
Suspect	25.6	(9.3)	15-42	7	48.3	(14.6)	20-59	6
GESELL PS								
Unknown	27.4	(4.5)	20-36	20	37.6	(9.2)	24-52	7
Suspect	25.7	(7.3)	16-35	7	46.8	(14.7)	22-62	6
GESELL DA								
Unknown	25.5	(3.1)	20-30	18	34.1	(6.6)	24-41	7
Suspect	24.7	(6.7)	17-33	7	44.3	(12.6)	21-57	6
GESELL DQ								
Unknown	63.2	(6.9)	55-73	18	57.8	(9.7)	44-71	7
Suspect	61.6	(12.3)	45-75	7	75.7	(19.9)	38-94	6
SICD CA								
Unknown	40.4	(2.9)	36-46	20	59.0	(3.7)	55-65	7
Suspect	39.4	(3.3)	37-46	7	57.4	(1.8)	55-60	6
ECA								
Unknown	20.2	(4.9)	12-32	19	30.0	(8.7)	16-40	6
Suspect	24.0	(12.0)	8-44	7	35.2	(12.4)	20-48	5
RCA								
Unknown	24.4	(4.7)	16-32	20	29.3	(7.9)	16-40	6
Suspect	29.3	(11.2)	16-48	7	36.8	(12.1)	20-48	5

Child Characteristics

Certain characteristics of the children in the longitudinal study appeared to be associated with problems frequently defined by parents during three vulnerable periods: diagnosis, entry into intervention, and transition from infant to preschool program (Bernheimer & Keogh, 1981). These stress points are related in part to the nature of developmental delay and deserve brief discussion.

First, the delay constitutes an "invisible handicap;" for the most part, these children look like normal children. Second, the delay is often expressed in varying degrees in different areas of development. For example, a 2½-year-old who is not using language may be close to age level in gross motor abilities. These "islands of normality," to borrow a phrase coined by Roskies (1972) in her description of the thalidomide babies, have created problems for parents and professionals alike throughout the life of the longitudinal study. A third and related child characteristic is the inconsistency exhibited by many of these children from day to day, even from moment to moment. Parents report a contrast between "on" days and "off" days and describe a widely varying range of abilities, depending upon the particular day. In short, parents are confronted with constantly conflicting evidence regarding the level of their child's abilities; consequently they have difficulty determining whether his or her development is indeed deviant, or merely uneven.

Changes Over Time

Diagnosis. In the presence of such confusing evidence, parents must be persistent, even strident, in expressing their concerns to professionals as they begin the search for a diagnosis. In the longitudinal study the families were Anglo, primarily middle class, and well educated (mean level maternal education 13+ years, mean level paternal education 14+ years). The majority had access to private pediatric care. Yet many parents felt their early concerns were not taken seriously; they were frequently urged to wait and were accused of being over-anxious. Within the group of 44 preschool subjects, for example, the mean age at which parents first became concerned was 6.5 months. The mean age of diagnosis was 13 months. Given the "state of the art" of infant assessment, the tenuous link between early development and ultimate outcome, and the pediatrician's understandable reluctance to label prematurely, 13 months does not seem an unreasonable age for diagnosis. From the parent's point of view, however, this period from first concerns to official diagnosis was unnecessarily long and painful. Additionally, 41% of the preschool parents and 52% of the infant parents had been concerned since birth, or within the first month of life. As one mother explained:

> It's hardest when your child is not diagnosed at birth, in the months between when you know something is wrong and you can't get anyone to believe that something is wrong. So you go around not saying anything to anyone --just knowing something is wrong. And until the time you get that first evaluation, that is probably the most difficult.

In their struggle to have their early concerns validated, or to obtain a consensus on the nature of the problem, parents frequently consulted a number of professionals. Not surprisingly, they were likely to be given as many diagnoses and prognoses as the number of professionals consulted. Ironically, the very behaviors which were indicative of parent strengths during this period are often viewed in the literature as being maladaptive (Bernheimer, 1981). The persistent parent is likely to be viewed as overanxious, while the parent seeking a consensus is often considered a "shopper." Parent strengths thus became viewed as parent needs: in the first case, the need to be less anxious; in the second case, the need to "accept" the diagnosis offered by the professional.

Entry into intervention. Once a diagnosis was obtained, problems did not end for these parents. On some levels they increased, particularly when the diagnosis was not followed by any suggestions for treatment or intervention. Although the mean age of diagnosis was 13 months in the preschool sample, the mean age of entry into intervention for these children was 25 months. Having lived with a delay between the time of initial concerns and diagnosis, parents were faced with yet another delay between the time of diagnosis and initial help.

Some parents were referred to a Regional Center immediately after the diagnosis, and for these families entry into intervention occurred earlier. Even so, the referrals did not always lead to an immediate reduction in stress. Early intervention programs, at least in the Los Angeles area, tend to serve children with more visible handicaps--children with Down syndrome, orthopedic handicaps, children with severe or profound retardation. For some of the longitudinal parents, the abrupt entrance into a world of such obvious abnormality was a severe shock. They found it hard to relate their child, with his "islands of normality," to the other children in the program. They also found it hard to relate to the other parents. For a few of the families, parent groups created additional stress, as opposed to much-needed support. One of the mothers stopped going to the meetings because she found the other mothers still needed the time to work through the pregnancy and perinatal period in an attempt to learn the reason for their child's handicap. Rather than trying to understand why her child was handicapped, this mother was still struggling to understand if her child was handicapped, and if so, to what degree. Another mother expressed feelings of guilt that her child was not handicapped enough to make her a worthy member of the group.

Transition between programs. Despite the problems reported by parents during their early days in intervention programs, most formed close bonds with members of the staff and other parents after the initial period. When their children turned three, however, many parents had to seek out a preschool program. At this point, several new problems arose.

First, they were often faced with a wide range of choices between programs differing in goals, emphases, and instructional modes. While most infant programs are noncategorical and hence not labeled, the preschools in the Los Angeles public schools present a bewildering array of labels: severe language disorder, severely emotionally disturbed, trainable mentally retarded, educable mentally retarded, orthopedically handicapped, multiply handicapped. Unfortunately, the children in the longitudinal study rarely had the labels to fit the programs.

Second, several of the parents discussed difficulties in leaving the infant intervention programs. In some cases, mothers were loathe to leave programs where they had been made to feel "safe." In other cases, parents were upset by the recommendations made by the infant programs for preschool placement. One mother was referred to a program serving primarily Down syndrome children. The staff had taken time to observe the program, and felt it would be a good next step for her child. Mother, however, was adamant that this would be an inappropriate placement, as her child would not receive sufficient language stimulation from the other children. The staff had another perspective: as this child's strongest area was language, she did not need the extra stimulation. Rather, with the degree of her emotional overlay, she needed to learn to use language more appropriately. The staff felt this could be achieved by the quality of the instruction, together with the high teacher-pupil ratio.

In another case, a developmentally delayed child was given a comprehensive staffing just before she turned three, in order that the staff from the infant program reach some consensus on a label which would provide access to an appropriate preschool program. This was the first time anyone had used the word "retarded" in front of the mother. The mother described her reaction:

> She went through the testing and this panel of people who I had trusted and who had supported me suddenly sat there and told me, "Well, this is it, kid--your child is mentally retarded." I was completely devastated. And also I believed it; I bought it completely. It was these people I trust, and if this group says it, well--that's it. And then flipping around again and saying, "Wait a minute." I think that's exhausting--trying to put my head someplace and not being able to do it, and having people constantly moving my brains around. It's one of the most frustrating things I've ever gone through in my entire life and I expect it to continue.

The last lines of this mother's remarks illustrate a third and ongoing problem during this period: the attempt to make sense of the marginality of these children; to decide whether they are more appropriately considered handicapped, or whether they can fit in with normal children (Bernheimer, 1981). Several of our parents dealt with this dilemma by placing their preschooler in both types of settings, the child spending several days a week in a special program, and the rest of the time in a normal nursery school. Those parents placing their children in a mainstreamed setting were faced with a new set of painful realizations as they compared their children to other children. One mother expressed her disappointment.

> ...that by sending her to a normal school she just didn't suddenly start talking like everyone else. Somehow it all hanged on that--this was going to make it all happen.

While she felt it was essential for her child to be part of the normal world, she found it very difficult for herself as a parent. She expressed her desire for another handicapped child in the school so she could form a relationship with the parent:

> I find it a very isolating experience, and it's very painful for me, having nobody there. I have never felt so isolated in a school situation ever before with any of my children. I feel I have not connected with the parents. I feel they sense my child is different. She's just beginning now to be invited to birthday parties--the entire last year she was not invited to any birthday parties. Now that I'm going with her, I'm agonizing at them because I'm always watching her behaviors and wondering if people are going to sense that she's odd. So they're difficult for me, but I think very nice for her.

Implications for Professionals

There are several implications for professionals in the information provided by the parents in the longitudinal sample. Many of these parents' needs become more comprehensible, given the marginality of their children's condition, the lack of specified etiology, and the ambiguity surrounding the diagnosis as well as the prognosis.

A sensitivity to the role played by time provides a useful frame of reference for assessing the needs of families with developmentally delayed children. During the search for a diagnosis, for example, the need most commonly expressed was for professionals who would recognize parent concerns and take them seriously. In addition, parents noted the need for access to more comprehensive information regarding programs and additional services.

When the families entered the system and became involved in an intervention program, many of them expressed the desire to meet other parents with developmentally delayed children, and not just parents whose children were severely handicapped. In making the transition from an infant program to a preschool, parents noted their feelings of estrangement from staff who had previously been perceived as supportive. Their accounts suggest the need for intervenors to be particularly sensitive to the parents' perceptions of the child at this point in time. Additionally, parents may need help in living with the label of a particular program, a label which may have been applied to their child quite arbitrarily in order that s(he) be accepted in an appropriate preschool program.

Once parental needs are understood, behaviors which the literature describes as counterproductive may be perceived as adaptive, and indicative of strength. It is appropriate for these parents to become persistent and assertive in their search for a consensus regarding diagnosis and the most appropriate intervention. It is adaptive for a mother to withdraw from a parent group whose members are concerned primarily with the periods of pregnancy and delivery. It is certainly appropriate, given the marginality of many of these children, for parents to attempt to straddle both worlds: the normal as well as the handicapped.

By any yardstick, the homes of the children in the longitudinal study were extremely adequate and the parents were extremely competent. Most had sought and obtained diagnoses, often in spite of obstacles erected by professionals. They had located intervention programs--several had their child in more than one--and outside therapists. They had acquired a great deal of knowledge about available services, and appeared to have endless amounts of stamina and energy necessary to keep what one mother termed "a tight machine running." Many of these parents were functioning as their children's case managers, in practice, if not in name.

It was clear, however, that parents did not want to function as case managers all of the time; that even for these highly competent, well-educated, middle class families, the role was an exhausting one. Professionals need to be aware of the stresses associated with the ongoing search for appropriate services. In their efforts to find help for young children with developmental delay, professionals may unwittingly add stress to the already stressful lives of these parents. Data from our longitudinal study suggest that there are periods in time when parents as well as children need advocacy.

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VI-B: Research Findings and Implications

The various programs of research and their findings have been described in the preceding sections of this report. The complexity of the research effort as a whole and the richness of the information provided by the many investigators makes synthesis into a single statement difficult, if not impossible. Examination of selected products (see listing Part VII) demonstrates that Project REACH investigators have been productive. To date, findings from the many studies are represented in 25 chapters, books, or monographs; over 75 articles, reviews, or proceedings; and 10 working papers. Over 250 presentations have been made at conferences, workshops, and professional meetings; these range from scholarly presentations such as those to the Society for Research in Child Development, the American Educational Research Association, and the American Psychological Association, to applied sessions with parents, Regional Centers, and preschool teachers who participated in REACH research. REACH staff have presented papers in many parts of the United States, as well as in Britain, Canada, and South America.

Specific programs of work within REACH have lead to new techniques or products which are useful to other researchers or intervenors. The infant laboratory work of Kopp and her associates provided methods for objective description and recording of complex infant/toddler attending and cognitive behaviors. REACH temperament work lead to development of a temperament questionnaire which is psychometrically sound, yet feasible to use in schools and intervention programs; the REACH questionnaire is now being used by researchers in Britain, Taiwan, and the Netherlands as well as in a number of places in the United States. The Teachable Pupil Scale, developed as part of the attribution studies, has been incorporated into studies by other researchers in several places in this country and in Britain, and is also being tried out in schools as a way of documenting pupil change. The Program Parameter Inventory is now ready for use by intervenors and requests are being filled. The bibliography of infant assessment measures has been widely disseminated in the United States and has been sent to clinicians in South America.

In addition to techniques and instruments, the content of REACH research is beginning to appear in other researchers' work and in the practices of intervenors. Our substantive findings have contributed in a number of ways. We have broadened understanding of young handicapped children's cognitive, social, motivational, and temperamental domains. We have identified developmental trends and the correlates of individual differences. We have provided insight into the emergence of self-control, have documented the interactive roles of attention, memory, and motivation, and have described the functional impact of program characteristics and individual differences in children's temperament on handicapped pupils' school experiences. The results of these studies have now been disseminated for use by other professionals.

Taken as a whole, the yield from five years of REACH work has been extensive. Another aspect of impact deserves note, however. While an additive model of productivity provides certain information, the summarizing numbers may not in the long run reflect the more important dimensions of impact generated by REACH. In our view, the findings in REACH studies and the experiences of the investigators within the Project have had far reaching effects on several sets of people: REACH faculty and students; colleagues in the University; professionals in the academic and research field; intervenors, teachers, clinicians and others at the service delivery level; and parents, families, and handicapped children. Finally, we suggest that the next steps involve policy and legislative changes which use research findings to improve services for handicapped children. In our view this aspect of the Institute work is best carried out by those in governmental agencies and in professional advocacy groups. We urge the use of REACH research findings for this purpose.

VI-C: Recommendations for Further Research

A common observation of historians is that advancement in a field is marked more by the nature of the questions asked than by the answers proposed. Certainly our experience in REACH has made us more aware of the complexity of the research topics addressed and has helped us define the kinds of questions which need to be asked. As summarized in sections VI A and B of this report, REACH researchers have produced a number of findings which have direct relevance to the development of handicapped children, their families, and the intervention programs which serve them. The various programs of research have also raised specific questions which relate to particular topics, e.g., cognition, attention, resources. These are addressed in summaries of the programs of work. Importantly, however, there have been a number of common topics which have emerged across the individual research efforts. Whether in studies of infants, toddlers, or preschoolers, whether focused on families, interventions, or child characteristics, REACH researchers have come to recognize and to grapple with certain pervasive problems, and to identify some fundamental topics. In our opinion these common problems and topics have priority for future research.

First, all Project researchers have struggled with measurement problems. Whether it be the developmental assessment of individual handicapped children or the documentation of intervention components, assessment techniques are limited, in some cases nonexistent. The psychometric adequacy, appropriateness, and interpretative validity of many commonly used developmental tests for assessing handicapped children is questionable. There are few reliable techniques for describing important affective and motivational characteristics of handicapped children, and few, if any, satisfactory ways to assess in detail the characteristics of the homes and schools in which handicapped children function. Instruments useful for certain age periods are discontinuous with instruments appropriate for other age periods. The factorial stability of any given instrument for different age groups is, for the most part, unknown. Differentiated functions on the construct level may not be evident on an operational level. Problems of assessment are particularly obvious in the toddler period from two to four years. The concern for biological, physical, and motoric integrity, salient in the assessment of infants, does not necessarily lead to refined and discriminating data for describing the developmental status of toddlers. Yet, most toddlers, particularly those with handicaps or delays in development, do not have extensive language skills, and their abilities to deal with abstract symbols, especially those presented graphically, are limited. Many of the standard tests, therefore, may provide incomplete pictures of the repertoire of toddlers, in some cases even underestimating the potential for growth. Assessment of children in this age period requires major changes in strategies, with the likelihood that greater reliance must be placed on observational, interactive techniques. The continued study, development, and test of adequate techniques for assessing handicapped children and the environmental influences on their development must be given high priority. Project REACH investigators have made progress in this area, but our work underscores the complexity of measurement when studying handicap. We consider this topic fundamental to continuing study.

Second, closely related to measurement/assessment issues is the need for specification of child characteristics which allow differential diagnosis. Research investigators often rely on system diagnosed or identified children as subjects. The efficiency and economy of this subject selection procedure is obvious. Yet, this approach to subject definition rarely leads to a clean sample, and the confounding of findings due to sample variance is often untested. For the most part the diagnostic labels which identify handicapped children are broadband and do not carry specific treatment or intervention implications. In our view the lack of direct bridge between diagnosis and intervention relates, in part at least, to the breadth of child characteristics found within any diagnostic grouping. The heterogeneity within diagnostic groups is often greater than the heterogeneity between diagnostic groups. At present it is possible to make predictive or probability statements about the consequences of particular handicapping conditions for groups, but the prediction or prognosis for individuals is uncertain. The delineation of diagnostic subgroups according to criteria which have functional use appears a necessary step in defining intervention and would likely lead to clearer subsamples which would reduce some of the confounds in system identified samples. Until there is precision of diagnosis, including specification of the functional rules of inclusion and exclusion, treatment and interventions will continue to be nonspecific. The specific child characteristics which lead to particular diagnostic decisions and the predictive validity of specific diagnostic indicators deserve study, especially as they relate to intervention considerations.

A third major research need has to do with the study of families of handicapped children, including consideration of the kind and range of resources necessary to facilitate positive home environments. Given the likelihood that increasing numbers of handicapped children will be reared in homes rather than in institutions, the quality of the home and the capabilities of parents to provide good care become important considerations from both child and family perspectives. To date the interactions of handicapped child and parent on physical, cognitive, and affective dimensions are little understood. A developmental, transactional perspective argues for careful specification of these interactions, particularly as they relate to long term consequences for both child and family. Yet, from a practical perspective, research using a transactional approach is difficult, perhaps impossible, to implement. At the least, it requires multiple measures and multiple data collection points. By definition it implies that different and perhaps unplanned-for topics must be incorporated into ongoing research strategies. The intriguing transactional issues of stabilities-instabilities and continuities-discontinuities become important considerations for research investigators. They also have implications for policy regarding research, as the acceptance of a transactional model to guide empirical work means long-term and substantial commitments to particular programs of research. With our family research REACH investigators have provided some direction for needed study, and we have also highlighted some of the difficulties of conducting research with families. Although this area of study is fraught with substantive and methodological problems, we consider it a critical topic for handicapped children and their families.

Fifth, a specific aspect of research on families relates to practical questions of need for supporting resources. Studies of resources are usually conducted from the professional or policy perspective, and there is often little evaluation of adequacy or satisfaction from the users perspective. From REACH research it is clear that many parents feel that the professional and community resources for their use are inadequate and/or unavailable. A particular point which has emerged from REACH longitudinal study is that families have continuing, albeit somewhat different, needs for services over time. Satisfactory professional help at one point may be inappropriate or ineffective at another. Just as children change, there is restructuring and reorganization within families so that the quality of home environments and atmosphere is not necessarily stable. Recognition of the continuing stresses and the changing and unique stresses in particular developmental periods is important if we are to provide supportive and effective help to parents. In REACH, work was focused on families of infants and preschoolers, yet some of our most important insights have come as we worked with families whose children were approaching public school age. There appear to be common stress points for many families of handicapped children, these stresses often tied to transitions or changes in children or needs over time. The continuing problems and the major stress points may be useful guidelines for decisions about delivery of services. The study of family stress and coping may also provide important insights into the nature of environmental influences on handicapped children's development.

Fourth, school programs like families, are potentially powerful influences on handicapped children's growth and adjustment. Despite the proliferation of intervention services, little systematic data are available which provide detailed description of programs, which delineate program components, or which assess the level and quality of implementation. REACH research has demonstrated the effect of preschool organization on children's social and cognitive interactions with their peers and teachers. We have moved from the simple notion of different outcomes as a function of school or no school. Important questions to be studied now focus on the specifics of instructional and management approaches and on possible aptitude treatment interactions.

Finally, from the perspective of all REACH researchers there is recognition of the interrelationships and interactions among the various personal ability domains, e.g., motivation, affect, cognition, language, temperament, and socialization. Our work has reinforced our belief in the old truism that there is, indeed, a whole child. The problems which need to be confronted now have to do with how and in what ways these domains interact, and to determine the principles of organization and reorganization. We have been struck with the broad range of individual differences in competence among our handicapped and nonhandicapped study samples. Clearly the presence or absence of handicap is not enough to ensure competence. The development of the socially competent individual is still a major educational goal and the understanding of that developmental process remains a fundamental research goal. It seems likely that understanding the impact of handicapping conditions on the development of competence will require longitudinal study of children, families, and interventions.

In sum, on the basis of REACH work, we suggest the need for continued research on measurement, subgroup diagnosis, families, interventions, and developmental integrations and transformations. We support the Research Institute concept as a means to further knowledge in these problem areas.

Part VII

PRODUCT LIST

A. Curricula, Materials, Guidelines, Instruments

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E. Major Presentations

Scholarly Presentations

Maurine Ballard

Issues in early intervention research. Paper presented at the American Association of Mental Deficiency Conference, Miami, May 1979.

Parents' and teachers' perceptions of academic and social competence of young handicapped children: An attributional analysis. Paper presented at the AERA national conference, Los Angeles, California, April 1981.

Lucinda Bernheimer

Coping over time: Parents and children in early intervention programs. In B. K. Keogh (Chair), Discussion Hour, Coping over time: Parents with handicapped children. Presentation at the 1981 biennial meeting, Society for Research in Child Development, Boston, April 1980.

Documenting change in handicapped children over time: Some clinical observations from a longitudinal study. In Walter Hodges (Chair), Issues in assessing handicapped infants and young children. Presentation at the AERA annual meeting, Los Angeles, April 1981.

Anne Glover-Wilcoxen

Language assessment. Presentation at a conference on the Assessment of Young Handicapped Children sponsored by Project REACH, Los Angeles, 1981.

Kim Johnson

Infant assessment: An analysis of sixty-six measures. Presented at the Western Psychological Association, Honolulu, May 1980.

An analysis of infant assessment measures. Presented at the International Conference on Infant Studies, New Haven, April 1980.

Use of diversionary strategies: 2-year-olds in a delay situation. Presented at the Society for Research in Child Development, Boston, April 1981 (with Claire B. Kopp).

Developmental assessment of handicapped infants: The question of test content. Presentation to the American Educational Research Association, Los Angeles, April 1981 (with Claire B. Kopp).

The emergence of strategy production in a delay task. Presentation to the American Psychology Association, Los Angeles, August 1981. (Part of the symposium entitled The emergence and nature of self-control in early childhood. Claire B. Kopp, Chair)

Barbara K. Keogh

Invited Presentation and Participation: University of Minnesota Round Table on Research in Learning Disabilities. Spring Hill Conference, Custer, Minnesota, October 1978.

Invited Presentation and Panelist: Educational Intervention with Hyperactive School Children. San Fernando Child Guidance Clinic. San Fernando, California, February 20, 1979.

Invited Presentation (with Robert Sheehan): Documenting Progress of Preschool Handicapped Children. International Conference of Association for Children with Learning Disabilities (ACLD). San Francisco, California, March 1979.

Invited Lecture: Hyperactivity and learning problems. Graduate School of Education, University of Virginia, Charlottesville, Virginia, April 6, 1979.

Current research in early childhood education: A review of Project REACH studies. Consultation with K. Wedell, Professor of Educational Psychology, Institute of Education, London University, London, U.K., October 1979.

Ask a different question: Expect a different answer. School Psychology Conference, sponsored by the National Association of School Psychologists, Division 16 of the American Psychological Association and the University of Minnesota, Spring Hill, Minnesota, June 1980.

Research needs in learning disabilities. Presentation to I.B.M. Canada and the University of Alberta, Department of Psychology, Conference on Learning Disabilities. Edmonton, Canada, November 1980.

The influence of temperament on the development of adaptive behavior. Presentation to the Research Training Program of the Frank Porter Graham Child Development Center: Distinguished Scholars Colloquium Series, Chapel Hill, September 1980.

Methods and techniques in the quantitative analysis of developmental data. Presentation to the American Educational Research Association annual meeting, Los Angeles, April 1981.

Relationship between student temperament and academic behavior. Chair and Discussant on Panel: American Educational Research Association annual meeting, Los Angeles, April 1981.

Invited Presentation: Training school psychologists in the eighties--A special educator's view. American Psychological Association Annual Meeting. Los Angeles, August 25, 1981.

Coping strategies over time--Families of handicapped children. Chair and Discussant: Society for Research in Child Development, Boston, April 1981.

Invited Paper: Children's Temperament and Teachers' Decisions. Ciba Conference on Temperamental Differences in Infants and Young Children, London, September 21-24, 1981.

Temperament research in REACH. REACH Dissemination Conference. UCLA, March 1982.

Temperament as an influence on handicapped children's personal-social relationships. CSULA Conference on Mental Retardation. Los Angeles, September 1982.

Temperament and school problems. Orton Society Meeting, Orange County, October 1982.

Temperament as an influence in learning disabled children's school progress. CANHC meeting. Los Angeles, November 1982.

Temperament contribution to children's experiences in schools. Conference on temperament in infants and young children. Salem, Massachusetts, October 1982.

Claire B. Kopp

Developmental Perspectives: Studies of Atypical Infants and Children. Chairperson and Discussant, Conversation Hour, Biennial Meeting, Society for Research in Child Development, New Orleans, 1977.

Early Motor Development. Third Annual Child Development Conference, Los Angeles, 1977. (Organizer and presenter)

Developmental Risk: Assessment: Intervention. (Invited address) Avepane, Caracas, Venezuela, 1977.

Invited presentation: Issues in the social and cognitive assessment of handicapped infants. Chaired: Discussion Group, Synthesizing research on developmental risk: Some possible mechanisms. Conference on Infant Studies, Providence, Rhode Island, March 1978.

Invited presentation: Research on early developmental risk: Comments and speculations. Western Psychological Association (invited address), San Francisco, California, April 1978.

Invited presentation: Screening and interpretation - Community liaison, training, program planning, and evaluation. World Congress on Future Special Education, Sterling, Scotland, June 1978.

Invited presentation: Measurement: The second year of life. TADS Topical Conference, Nashville, Tennessee, September 1978.

Invited presentation: Research on Early Abilities of Children with Handicaps - Project REACH. HCEEP Project Directors' Conference, Washington, D.C., November 1978. Also, presentation: Research on families.

REACH Data Base. Conference for BEH Institutes, University of Kansas, Data Base, Lawrence, Kansas, November 1978.

Presentation: Emergence of self-regulatory process in infancy and early childhood: Conceptual perspectives. Society for Research in Child Development Biennial Meeting, San Francisco, California, March 1979.

Presentation: Project REACH: A program of research in early childhood. International Conference of the Association for Children with Learning Disabilities, San Francisco, California, March 1979.

Invited address: Identification of the high-risk infant. Conference at Loyola University, Chicago, April 1979.

Chairperson: Conditions for Development Risk. Presentation (with Susan Markowitz): Mother-infant interactions with Down's Syndrome and normal infants. American Psychological Association annual convention, New York, September 1979.

Invited discussant: SRCD representative; Child Development Section, American Association of Pediatrics, San Francisco, October 1979.

The issue of infant assessment. HCEEP (Bureau of Education for the Handicapped), Washington, D.C., December 1979.

Clustering strategies in normal and handicapped infants. Presentation at the Tenth Annual Conference: Piagetian Theory and the Helping Professional, February 1980 (with J. B. Krakow & K. Johnson).

Research on the developmental of attentional processes in normal and handicapped young children. Presentation to the Gatlinburg Conference on Mental Retardation/Developmental Disabilities, March 1980.

Invited presentation (with J. B. Krakow): Deployment of attention among normal and handicapped children in the second year of life. The Gatlinburg Conference on Research and Theory in Mental Retardation, March 1980.

Invited presentation: Using theory to conceptualize research with handicapped young children. Presented at the Conference on Handicapped and At-Risk Infants: Research and Application, Asilomar, April 1980.

Panel discussant (L. A. Sroufe, Chair): Issues in longitudinal research. Presented at the International Conference on Infant Development, New Haven, April 1980.

Individual differences in sustained attention in the second year of life. Presentation to the International Conference on Infant Studies, New Haven, April 1980 (with J. B. Krakow).

Patterns of sustained attention in normal and handicapped infants. Presentation to the International Conference on Infant Studies, New Haven, April 1980 (with J. B. Krakow).

Theoretical issues related to research with handicapped children. Invited presentation, Application of Research Findings to Intervention with At-Risk and Handicapped Infants Conference, University of Oregon, Asilomar Conference Center, April-May 1980.

Presentation at the BEH Early Childhood Research Institute Infancy Meeting, University of Kansas, Lawrence, July 1980.

Invited discussant, American Academy of Pediatrics, October 1980.

Research on patterns of attention in young handicapped children. Invited presentation at the First Annual Research Symposium, Washington University, St. Louis, October 1980.

Attentional processes in the second year of life. Presentation at the HCEEP Conference, Washington, D.C., December 1980.

Chairperson and presenter, Eleventh Annual International Interdisciplinary Conference on Piagetian Theory and the Helping Professions, Los Angeles, January 1981.

Characterizing samples of at-risk and handicapped infants and young children. Presentation to the Annual Conference on Theory and Research in Mental Retardation, Gatlinburg, March 1981 (with J. Krakow).

Developmental assessment of handicapped infants: The question of test content. Presentation to the American Educational Research Association, Los Angeles, April 1981 (with Kim Johnson).

Conceptual and methodological issues in the study of at-risk and handicapped children. Presentation to the Society for Research on Child Development, April 1981. Chair and presentor (with Craig Ramey, J. Brownlee, & M. Lewis).

The emergence of self-control and self-regulation processes in early childhood: Cognitive, language, and social/personality perspectives. Society for Research in Child Development, April 1981. Chair and presenter (with B. E. Vaughn, H. S. Waters, V. Tinsley, & J. C. Schwarz).

Issues on sex differences: Needed research about children. Invited presentation to the Western Psychological Association, Los Angeles, April 1981.

Lecture: Project REACH: A Five Year Study on the Early Abilities of Infants and Children, UCLA Extension Session, July 1981.

Invited Address: Self control in young handicapped children, (with J. Krakow & B. Vaughn), Minnesota Symposium on Child Development, October 1981.

Invited Address: Assessment of young children. California CEC Conference, November 1981.

Presentation: Patterns of self control in handicapped children. HCEEP meeting, December 1981.

Self Control in the Young Developmentally Delayed Child, in Symposium. The Emergence and Nature of Self-control in Early Childhood. American Psychological Association, August 1981.

Presentation: Divergent Themes in American Child-rearing Advice (with Sheila Balkan). American Psychological Association, Los Angeles, August 1981.

Presentation: Cognitive development and exceptional infants. Conference on Clinical and Applied Issues in Infant Development, UCLA, October 1981.

Presentation and Chair: Session on Risk. Conference on Infant Studies, March 1982.

Invited Symposium: Early Identification and Prevention: A view from the past with an eye toward the future. Symposium Research Trends in Mental Retardation: Past, present, and future, Lorraine Glidden, Chair, April 1982.

Joanne B. Krakow

Peer review (with K. Johnson & C. B. Kopp): Strategy production in normal and handicapped infants. Presented at the Annual Meeting of the Western Psychological Association, Honolulu, May 1980.

Peer review (with K. Johnson and C. B. Kopp): Sustained attention in normal and Down's Syndrome infants. Presented at the Annual Meeting of the Western Psychological Association, Honolulu, May 1980.

Longitudinal study of sustained attention and self-control in infancy. Presentation to the Western Psychological Association, Los Angeles, April 1981 (with C. B. Kopp).

The coherence of sustained attention and self-control in early life. Presentation to the Society for Research in Child Development, Boston, April 1981 (with A. Weickgenant).

The emergence and gradual consolidation of self-control from 18 to 30 months of age. Presentation to the Society for Research in Child Development, Boston, April 1981 (with K. Johnson).

Infant's first steps: Does it matter when? Presentation to the Western Psychological Association, Los Angeles, April 1981 (with A. Weickgenant & C. B. Kopp).

Sustained Attention and its Developmental Relation to Self-Control. Presented at American Psychological Association, Los Angeles, August 1981 (Symposium, other papers by K. Johnson, C. Kopp, & B. Vaughn).

Antoinette Krupski

Assessment of attention: Problems in the classroom. American Academy on Mental Retardation, New Orleans, May 1977.

Attention Problems in the Classroom. Third Annual Southern California Conference on Reaching Children and Adolescents with Learning Disabilities and Behavior Disorders. Los Angeles, February 1978.

Presentation: Relationship between learning handicapped children's perception of school tasks and classroom behavior, and Chair: Symposium at the Gatlinburg Conference on Research and Theory in Mental Retardation, Gulf Shores, Alabama, April 1979.

Presentation: The relationship between structural task characteristics and episodes of inattention in children with serious attention problems: A descriptive study. 5th International Congress of the International Association for the Scientific Study of Mental Deficiency, Jerusalem, Israel, August 1979.

Invited presentation: Attention and learning handicap: Are subnormals more distractible? Medical Research Council, Developmental Psychology Research Unit, London, England, November 1979.

Gerald Mahoney

Presentation: The linguistic environment of the mentally retarded child. Annual Convention of the American Association on Mental Deficiency, Miami, Florida, May 1979.

Michael Pullis

Presentation: The role of non-intellectual factors in the assessment and determination of school risk. Presented at the annual meeting of the AERA, Los Angeles, 1981.

Presentation: Temperament characteristics of LD students and their impact on teachers' decisions: A view from both sides of the mainstream. Paper presented at the annual meeting of the AERA, New York, March 1982.

Deborah Stipek

Presentation (with L. Tannatt & M. Sanborn): Children's perceptions of competence in school. 1980 meeting of the American Educational Research Association.

Presentation (with J. Hoffman): Children's attributions for failure. Presented at the 1980 meeting of the Western Psychological Association.

Presentation (with J. Hoffman): The effect of past performance histories and sex on children's expectations for success at a novel task. Presented at the 1980 meeting of the Western Psychological Association.

Submitted (with J. Hoffman): The emergence of sex differences in achievement-related cognitions. To the 1980 meeting of the American Psychological Association.

Presentation: The student role in learning development (Invited address). American Educational Research Association, Division G, Santa Barbara, California, May 1980.

Presentation: Parent belief systems as predictors of children's cognitive development and school performance--discussant. American Educational Research Association, Los Angeles, April 1981.

Presentation: The development of achievement-related emotions. American Educational Research Association, Los Angeles, April 1981.

Presentation: Student perspectives and the study of the classroom--Discussant. American Educational Research Association, Los Angeles, April 1981.

Presentation: Children's use of past performance information in ability and expectancy judgments. International Society for the Study of Behavioral Development, Toronto, Canada, August 1981.

Brian Vaughn

Presentation: Current status of research activity at Project REACH. California First Chance Consortium Conference. Asilomar Conference Grounds, Monterey, California, March 1980.

Summary of Project REACH Infancy Research. Presentation at the Piaget Society meetings, University of Southern California, January 1981.

The consolidation of self-control and the emergence of self-regulation from 18 to 30 months of age: Normative trends, individual differences, and external correlates. Presentation at the meetings of the Society for Research in Child Development, Boston, April 1981 (with C. B. Kopp).

A maternal report measure for evaluating individual differences in sustained attention and self-control: Development and validation. Presented at the meetings of the Western Psychological Association, Los Angeles, April 1981 (wth D. Tillipman & C. B. Kopp).

The role of memory aids and impulsiveness in short-term memory for very young children. Presentation at the meetings of the Western Psychological Association, Los Angeles, April 1981.

Marlene Young

Coping patterns over time: Diagnosis and the identification of initial help. Discussion hour: In. B. K. Keogh (Chair), Coping patterns over time: Parents with handicapped children. Biennial meeting, Society for Research in Child Development, Boston, April 1981.

Presentation: Diagnosis and the identification of initial help. In Stress points over time: Parents with handicapped children. Sympoisum presented at The Needs of The 90's: A Research Conference on Young Children and Their Families, sponsored by Institute for Early Childhood Education, California State University, Fullerton, June 1981.

Presentation: The child's handicap and parents' use of support systems. In Services for young children with developmental delays: Some parent perspectives and the system response. Symposium presented at the annual meeting of the California State Federation Council for Exceptional Children. San Diego, California, November 1981

Presentation: Larger Environments: Families. Project REACH Dissemination Conference, University of California, Los Angeles, March 1982.

Professional Presentations

Nancy Baker

Invited Presentation: Infants' schemas in approaching a sensory motor task. Piaget Conference, Los Angeles, February 1980.

Lucinda Bernheimer

Issues in the assessment of young children (with Robert Sheehan, Ph.D.). Project HOPE, San Diego County Board of Education, 1980.

REACH Longitudinal Study. San Gabriel Valley Regional Center, October 1980.

Presentation: Issues in serving families of young children with developmental delay. San Fernando Valley Child Care Consortium Seventh Annual Conference. Los Angeles, October 1981.

Presentation: Services for young children with developmental delays: Some parent perspectives and the system response (with Marlene Young and Carol Larson). California State Federation Council for Exceptional Children 31st Annual Conference. San Diego, November 1981.

Presentation: Parenting young children with developmental delay: Implications for social work (with Barbara K. Keogh). American Public Health Association Annual Meeting. Los Angeles, November 1981.

Presentation: Assessing needs and strengths in families with developmentally delayed children. HCEEP/DEC 1981 Conference, Washington, D.C.

Presentation: A longitudinal study of young children with developmental delay. Project REACH Dissemination Conference. Los Angeles, March 1982.

Presentation: Ethical issues in longitudinal studies of families with handicapped children. In. B. K. Keogh (Chair), Ethical Issues in Research with Handicapped Children. Council for Exceptional Children 60th Meeting. Houston, Texas, April 1982.

Presentation: Parent perspectives on living with developmental delay: Implications for professionals (with Barbara K. Keogh & Claire B. Kopp). Association for the Care of Children's Health 17th Annual Conference. Seattle, Washington, June 1982.

Nancy Burstein

Presentation: The structural aspects of preschool intervention programs. Paper presented at the meeting of the California State Federation Council for Exceptional Children, San Diego, November 1981.

Presentation: Mainstreaming: Organizational influences on children. Paper presented at California State University, Northridge, Student teacher seminar, February 1982.

Presentation: PPI: A system for describing intervention programs. Paper presented at Project REACH Dissemination meeting, Los Angeles, March 1982.

Presentation: Organizational influences on children's experiences in mainstreamed settings. Paper presented at Project REACH Dissemination meeting, Los Angeles, March 1982.

Presentation: Influences of organization, teacher involvement, and severity of handicap on preschool children's experiences in mainstreamed settings. Paper presented at California State University, Northridge, faculty meeting, April 1982.

Anne Glover-Wilcoxen

Presentation: Measuring change in language development. Paper presented at the California State Federation Council for Exceptional Children, San Diego, 1981.

Presentation (with M. Briggs): An item analysis procedure for measuring change in language development. Paper presented at the American Speech, Language, and Hearing Association meeting, Los Angeles, 1981.

Kim Johnson

Presentation: An analysis of assessment measures for the sensorimotor period. Tenth Annual UAP/USC Conference of Piagetian Theory and the Helping Professions.

Barbara K. Keogh

Invited Presentation: An approach to early identification of children at-risk for school. Annual Meeting of the Orton Society. Minneapolis, Minnesota, November 1978.

Participant and Consultant: Virginia Learning Disability Council Meeting on TV In-Service Training for Teachers of LD Children. Virginia, September 1978.

Invited Keynote Address: Early Identification of High-Risk Children--Some Problems with Forest and Trees. Annual Meeting of the New Mexico Federation for Exceptional Children. Albuquerque, New Mexico, October 1978.

Invited Presentation: Research on the early identification of children at risk for school. Annual Meeting of the North California Orton Society. Palo Alto, California, January 1979.

Invited Presentation: Early Identification of Learning Disabled Children. Meeting of the California Association for Neurologically Handicapped Children (CANHC). Santa Barbara, California, February 21, 1979.

Invited Address: Early identification of children with learning disabilities: Issues and future directions. Annual Meeting of the Canadian Association for Children with Learning Disabilities. Montreal, Canada, March 23-24, 1979.

Invited Keynote Address: Temperament--Its relation to learning and behavior. Annual Meeting of the Virginia Association for Children with Learning Disabilities. Charlottesville, Virginia, April 7, 1979.

Invited Reaction: Panel on History and Future Directions in Early Childhood Special Education. Annual Meeting of the Council for Exceptional Children. Dallas, Texas, April 24, 1979.

Invited Presentation: Research in Project REACH. Early Childhood Institute Panel, Annual Meeting of the Council for Exceptional Children. Dallas, Texas, April 25, 1979.

Lecture and Workshop: Early identification and intervention with children with learning disorders. The Third Annual Newell C. Kephart Memorial Symposium on the Education of the Handicapped Child. Aspen, Colorado, July 1979.

Panel Participant: Guidelines for the early identification of children with learning problems. Columbia Association for Children with Learning Disabilities. Vancouver, B.C., Canada, February 1980.

Keynote Address: Motivational and affective influences on children's achievement. Santa Barbara Chapter of the California Association for Children with Neurological Handicaps, Santa Barbara, March 1980.

Children's temperament and teachers' decisions. San Diego County Chapter of the Orton Society, San Diego, October 1980.

Temperament and teachability: Teachers' perceptions and educational decisions. Southern California Orton Society, Newport Beach, March 1981.

Invited Presentation: Children's temperament patterns as influences on teachers' decisions. CANHC-ACLD State Conference. Los Angeles, November 8, 1981.

Professional Presentation: Assessing competence of young handicapped children. Council for Exceptional Children State Conference. San Diego, November 13, 1981.

Consultant and Participant: Frostig Center for Education Therapy Retreat. Kellogg Center, Pomona, California, February 1982.

Handicapped children in the preschool classroom. Presentation to the faculty and parents of the CSUN Preschool. Northridge, California, April 1982.

Changing stress over time: Families of young children with developmental delays. St. Johns Hospital Child Study Center professional seminar. Santa Monica, April 1982.

Handicapped children's experiences in the mainstream. Project REACH Parent Dissemination meeting, UCLA, May 1982.

Professional Presentation: Assessment and evaluation. Conversation Hour of the Early Education and Child Development Group. American Educational Research Association Annual Meeting. New York, NY, March 1982.

Presentor and Participant: REACH Dissemination Conference. UCLA, March 1982.

Chair and Participant: Symposium on Ethics in Research with Exceptional Children. Council for Exceptional Children Annual Meeting, Houston, TX, April 1982.

Temperament as an influence on handicapped children's personal-social relationships. CSULA Conference on Mental Retardation. Los Angeles, September 1982.

Temperament and school problems. Orton Society meeting, Orange County, October 1982.

Temperament as an influence in learning disabled children's school progress. CANHC meeting. Los Angeles, November 1982.

Temperament contribution to children's experiences in schools. Conference on temperament in infants and young children. Salem, Massachusetts, October 1982.

Claire B. Kopp

Consultant--AVEPANE, Caracas, Venezuela (1976-1977); and other organizations on infant preschool intervention programs; training personnel, etc. 1977-1981.

Presentation: Early intervention. Developmental Disabilities/Special Education Immersion Program, Pacific State Hospital, Pomona, February 1979.

Invited Address: Developmental sequences and individual differences: An interactive perspective. 9th Annual USC-UAP Interdisciplinary International Conference on Piagetian Theory and the Helping Professions, Los Angeles, California, February 1979.

Invited Address: Maternal-infant bonding. First Annual Prevention Conference, Children's Hospital, Los Angeles, June 1979.

Consultant: Project SHINE, WESTAR, San Francisco, July 1979.

Invited Presentation (wth Marlene Young): The study of support systems. Santa Monica West Child and Adolescent Comm. Meeting, Kennedy Child Study Center, Los Angeles, September 1979.

Invited Lecture: Prenatal and perinatal influences on developmental outcome. Neonatology Fellows, Cedars-Sinai Hospital, Los Angeles, September 1979.

Invited Presentation (with S. Balkan): Development of the early child rearing literature: Influence of social forces. Presented at the meeting of the Society for the Study of Social Problems, New York, August 1980.

Training to work with infants and young children. Mailman Winter Conference on Training in Applied Child Development, Miami, January 1981.

Invited Presentation: Motor development in the 2nd and 3rd years of life. North American Society for Sport and Physical Activity, Asilomar, May 1981.

Barbara Kornblau

Invited Presentation: Comparison of preschool and elementary teachers' perceptions of teachable pupils. Council for Exceptional Children State Meeting, Anaheim, California, November 1979.

Invited Presentation: Teachers' perceptions of teachable pupils: Comparison of regular and special education teachers. Pepperdine University, First Annual Conference on Learning Disabilities, Orange County Campus, February 1980; Los Angeles Campus, March 1980.

Inservice: Staff development. Preschool and kindergarten teachers' perceptions of teachable pupils. Congregational Church of Chatsworth Preschool, Chatsworth, California, December 1979.

Inservice: Staff and parents. Perceptions of teachable pupils. Winnetka Avenue Elementary School, Los Angeles Unified School District School Site Council, January 1980.

Joanne B. Krakow

Reviewed Presentation (with K. Johnson & C. B. Kopp): Clustering strategies in normal and handicapped infants. Tenth Annual UAP Conference: Piagetian Theory and the Helping Professions, Los Angeles, February 1980.

Invited Presentation: Issues that arise with families of infant handicapped research participants. Piagetian Theory and the Helping Professions, University Affiliated Program, University of Southern California, January 1981.

Antoinette Krupski

Presentation: New directions in educational assessment. California Association of School Psychologists and Psychomotrists. Los Angeles, CA, March 1977.

Invited Presentation: Attention problems. Fresno Staff Diagnostic School for Neurologically Impaired Children. Fresno, California, May 1981.

Presentation: Variations in attention as a function of classroom task demands. Paper presented at meetings of the American Psychological Association. Los Angeles, California, August 1981.

Presentation: Display vs. memory search among mentally retarded and nonretarded youngsters. Paper presented at the meetings of the American Psychological Association, Los Angeles, California, August 1981.

Presentation: Assessment of attention problems in the classroom. Paper presented at meetings of the California State Federation of the Council on Exceptional Children. San Diego, California, November 1981.

Gerald Mahoney

Presentation: The relationship of mother/child language interaction to language intervention programs. North Los Angeles Regional Center, October 1978.

Presentation: The relationship of mother/child language interaction to language intervention programs. East Los Angeles Regional Center, October 1978.

Presentation (with A. T. Glover): The relationship of sensorimotor development and the development of language in mentally retarded and nonretarded children. Paper presented at the Tenth Annual International Interdisciplinary UAP Conference on Piagetian Theory and its Implications for the Helping Professions, Los Angeles, California, 1980.

Diane Parham

Presentation: Maternal behaviors and child self-control. Project REACH Dissemination Meeting, UCLA, March 1982.

Robert Sheehan

Keynote Address: Evaluation strategies in early childhood special education: A National perspective. WESTAR Topical Conference on Evaluation. Albuquerque, NM, January 1979.

Continued involvement with Consortium Adaptive Performance Evaluation (CAPE) in development of Adaptive Performance Inventory (API) as third party evaluation, Seattle, Washington, Fall, 1979.

Presentation: Documenting children's progress. Council for Exceptional Children. Dallas, Texas, April 1979.

Presentation: The worth of follow through. Association for Childhood Education International (ACEI). St. Louis, MO, April 1979.

Colloquium (with Cindy Bernheimer) on Issues in the assessment of young handicapped children for Project HOPE, Department of Education, San Diego County, February 1980.

Staff training workshops on Documentation of Progress for WESTAR Staff, Seattle, Washington, February 1980.

Colloquium: Evaluation and documentation of progress for staff of Human Development Center, University of Oregon, February 1980.

Training workshop for BEH Project Directors on Documentation of Progress, Salt Lake City, Utah, February, 1980.

Infant assessment: A review and reaction. Handicapped and at-risk infants: Research and application. Asilomar, CA, April 1980.

Assessment and screening in early childhood: Issues from research. Chair and presenter of symposium at Council for Exceptional Children. Dallas, Texas, April 1980.

Presentation (with B. Keogh & P. Watson): An examination of variability in the processing of young children's developmental data. American Educational Research Association (AERA). Los Angeles, California, April 1981.

Presentation (with B. Keogh): Methods and techniques in the quantitative analysis of developmental data. American Educational Research Association (AERA). Los Angeles, CA, April 1981.

Brian Vaughn

Presentation: Summary of Project REACH research. Easter Seal Society, Ventura, California, February 1981.

Anne Wilcoxen

Presentation: Language assessment. Conference on the Assessment of Young Handicapped Children sponsored by Project REACH, Los Angeles, 1981.

Presentation: Measuring change in language development. California State Federation Council for Exceptional children, San Diego, 1981.

Presentation (with M. Briggs): An item analysis procedure for measuring change in language development American Speech, Language, and Hearing Association meeting, Los Angeles, 1981.

Presentation: Documenting language development in young developmentally delayed children. REACH Dissemination Conference, UCLA, March, 1982.

Presentation: The experiences of a preschool hearing impaired child in a mainstreamed classroom: An ethnographic study. Project REACH Dissemination meeting, UCLA, March 1982.

Brenda Wright

Presentation (with A. Glover-Wilcoxen & B. Keogh): Children's temperament and teachers' decisions. CASPP, Sacramento, California, April 1981.

Marlene Young

Presentation (with C. B. Kopp): Support system research. Santa Monica West Child and Adolescent Committee, September, 1979.

Presentation: Resources and support systems for young handicapped children: Parents' perspectives. Project REACH Quarterly Meeting of Ring Facility Professionals. University of California, Los Angeles, CA, June 1980.

Presentation: Resources and support systems for young handicapped children and their families. Longitudinal Parent Meeting sponsored by Project REACH. University of California, Los Angeles, May 1981.

University Presentations

Maurine Ballard

Presentation: Issues in identification of variables which contribute to the success of young handicapped children in educational settings. Presentation at the University of Minnesota L.D. Institute, April 6, 1979.

Presentation: Perceptions of social competence in young handicapped children. Coloquium presented at the University of California, Santa Barbara, April 25, 1979.

Lucinda Bernheimer

Presentation: Infant and pre-school education for handicapped children. Seminar on mental retardation, Neuropsychiatric Institute, UCLA Extention and UCLA School of Medicine, April 1980.

Presentation: Issues in parenting handicapped children over time. Graduate seminar, California State University, Los Angeles, August 1980.

Presentation: Stress points over time: Making the transition from infant to preschool programs. The Needs of the Nineties: A Research Conference on Young Children and Their Families. California State University at Fullerton, June 1981.

Presentation: Assessing the transition child. UCLA Extension Conference, Los Angeles, CA, June 1981.

Barbara K. Keogh

Bush Seminar Presentation: The implications of the use of marker variables in research on learning disabilities. UCLA, June 1, 1979.

Panel Participant: Social policy and education of handicapped individuals. UCLA Department of Psycholgy Summer Course, August 1979.

Lecture: Affective and temperamental contributions to learning problems. UCLA Department of Pediatric In-Service Series, UCLA, March 1980.

Panel Participant: Education of hyperactive and learning disabled children. UCLA Department of Psychology Summer Course, July 1979.

Lecture: Attention and hyperactivity. UCLA Extension Program. Education and the Brain, Part III, UCLA, March 1980.

Invited Lecture: Research on individual differences. Department of Special Education. San Francisco State University, San Francisco, CA, May 6, 1980.

Research on individual differences and teachers' decisions. UCLA, University Elementary School, January 1981.

Claire B. Kopp

Invited Presentation: History of 19th century child rearing. Pediatrics History Seminar, UCLA, January 1978.

Invited Presentation: Sensorimotor assessments. Child Psychiatry Seminar, University of Southern California, Los Angeles, CA, April 1978.

Invited Presentation: Early motor development. Kinesiology Seminar, UCLA, May 1978.

Invited Presentation: Infant assessment and intervention. Experimental Learning Center, UCLA Extension, May 1978.

Invited Presentation: Issues in research and infancy. Core I Seminar, UCLA, Special Education, October 1978.

Invited Presentation: Development of intelligence. Public Health Seminar, UCLA, October 1978.

Research on infancy. Infant Development Association, UCLA, April 1979.

Invited Lecture: Research strategies. USC, Los Angeles, May 1979.

Invited Presentation: Developing maternal bonds and parenting skills. Prevention and intervention for mental retardation and autism. University of California, San Diego, November 1979.

Early intervention. Developmental Disabilities/Special Education Immersion Program, UCLA, 1979.

The young handicapped child. Undergraduate seminar, UCLA, May 1980.

Assessment and intervention. Developmental Disabilities/Education Immersion Program, 1980.

Early intervention. Developmental Disabilities/Education Immersion Program, May 1981.

Cognitive development. Public Health Seminar, 1981.

Intervention. Developmental Disabilities/Education Immersion Program, November 1981.

Risk and Intervention. Developmental Disabilities/Education Immersion Program, May 1982.

Antoinette Krupski

Invited Presentation: Research into attention problems in children with a variety of learning difficulties. Department of Child Development and Educational Psychology, Postgraduate Research Seminar Series, Centre for the Study of Human Development Research Unit, University of London Institute of Education, London, March 1980.

Invited Special Lecture: Attention problems in children with learning difficulties. University of London Institute of Education. London, May 1980.

Invited Presentation: Research on attention problems. UCLA Department of Psychiatry. Los Angeles, California, July 1981.

Invited Presentation: What are we studying when we study attention problems? UCLA Psychiatry Department Seminar Series, Los Angeles, CA, February 24, 1982.

Gerald Mahoney

Presentation: The relationship of mother/child language interaction to language programs. California State University, Los Angeles, Department of Special Education, July 1978.

Brian Vaughn

Summary of Project REACH infancy research. Special Education, UCLA, November 1980.

A summary of Project REACH research with infants. California State University, Los Angeles, CA, Special Education Class, September 1980.

Marlene Young

Utilization of resources and support systems by parents of handicapped children. Course entitled Working with Families of Young Handicapped Children, California State University, Los Angeles, March 1981.

Part VIII

DISSEMINATION ACTIVITIES

Our overriding dissemination goal was to provide empirical evidence and relevant applications gained from our studies. A Project REACH dissemination plan was formulated and is depicted graphically in the following model. The REACH plan directs specific kinds of information to major target groups--parents, clinician/teachers, researchers, and policy planners. The approach is selective in that it takes into account the nature and kinds of information each target group has traditionally needed.

The content of REACH dissemination was divided into three areas--theory information, and application. Theory refers to conceptualization generated by REACH researchers to guide a domain of study, to clarify developmental or educational issues, to synthesize data, or to propose new and innovative approaches to measurement questions. Information refers to the broad array of empirical findings generated by REACH researchers. Cutting across the age periods of infancy, preschool and early school years, data were derived from studies of cognition, temperament, social, motivation and linguistic child attributes. Other findings bear on parent needs, intervenor and program characteristics. Application consists of two types of material. One includes empirical findings that are directly relevant to intervenors and educators. The other comprises products generated by REACH staff such as the infant assessment brochure, information collected about program parameters, and so forth.

The strategies employed in dissemination took advantage of local media resources, clinical and educational publications and meetings, local parent groups and newsletters, meetings of legislators and policy analysts, and academic conferences and publications. In a number of instances, REACH initiated contacts with representatives of local organizations as a prelude to formal dissemination. During the period of the project, REACH received 2,202 requests for information and distributed over 7,000 copies of REACH products.

The following list represents audiences which received Institute products used by Project REACH. Mailing lists containing names and addresses of selected agencies and institutions is also included. Not included in these lists are names of 313 individuals, as well as 245 names on the Handicapped Children's Early Education Program mailing list who have also received REACH mailings.

PROJECT REACH DISSEMINATION MODEL

CONTENT

		THEORY: Developmental/ Educational	INFORMATION: Child Characteristics/ Larger Environment	APPLICATION OF FINDINGS
A U	ACADEMIC	XXX 1	XXX 2	3
D I	INTERVENORS/EDUCATORS	X 4	XXX 5	XX 6
E N	PARENTS/ PUBLIC	7	XXX 8	XX 9
C E	SOCIAL POLICY MAKER	10	XX 11	12

Levels of content X = density of information

a) General information on research and the handicapped

b) Specific information on REACH findings

Possible Dissemination Vehicles (keyed to matrix)

1. Academic conferences and publications
2. Special Education programs; graduate seminars
4. Clinically oriented publications, e.g., Exceptional Children REACH Ring Facility meetings
5. State Special Education groups; Infant Intervention programs; American Academy of Pediatrics Special Education Training Program; Head Start Program; REACH Ring Facility meetings
6. REACH products, e.g., Bibliography of Screening and Assessment Measures for Infants; TEACHABLE Public Survey; Temperament Scales
8. Parent magazines and newspapers, e.g., The Exceptional Parent
   Radio and press releases
   Status reports on REACH findings for parents
9. REACH parent meetings; local parent groups; parent newsletters; Parent Handbook
11. Status reports on REACH findings

Listing of Audiences Which Received Institute Products

Category	Title of Organization/Group	No. of Members/Units
Academic	American Academy of Pediatrics Committee on Children with Handicaps	20
	Academic Programs	63
	Professional programs accredited by the Committee on Allied Health Education	109
Clinical	REACH Ring Facilities	36
	Intervention centers and educators in the Southern California region	445
	Infant Intervention Programs in the Greater Los Angeles Area	211
	HCEEP Directors	247
	Non-HCEEP Directors of pre-school and infancy intervention programs (national)	214
	Head Start Programs-Western Region	75
	American Academy of Pediatrics-Training Units	71
	National Teachers Center Exchange	326
Social Policy	National Association of State Mental Retardation Program Directors	55
	State Education Public Awareness Child Find Co-ordinators	36
	National Child Advocacy Organizations	52
Parents	Parents	320
	Total	2280

Part IX

TRAINING

Training has been an integral part of REACH, and a variety of training activities have been offered under REACH auspices. Pre-doctoral students and post-doctoral fellows have been involved at all operational stages of the many studies, participating from conceptualization through dissemination. The opportunity to work with REACH design and statistical consultants in the planning and carrying out of data analyses has proved to be particularly valuable in developing students' analytic and computer skills. It should be noted that a number of students have subsequently extended REACH studies in their own dissertation work; for example, Young, Markowitz, Burstein, Ballard, Hall, and Kornblau. In some cases work initiated under REACH has been continued and developed as former REACH students have gone on to other professional positions. A listing of pre- and post-doctoral students who have received training within REACH may be found in Table IX-1. Supervising faculty are identified. A list of dissertations by these students, in process or completed, is found in Table IX-2. Table IX-3 contains a listing of former REACH students who are now continuing their own research in other settings. In-depth involvement in the planning and implementation of actual research studies was an aspect of training incorporated into the project as a whole.

As part of research training, study or project teams met weekly under the direction of the appropriate senior investigator (Chan, Keogh, Kopp, Krupski, Mahoney, Stipek). In addition, representatives from each of the preschool study teams met weekly to coordinate and facilitate the overall conduct of research and to discuss broader aspects of research problems. The Infancy group held comparable meetings. Pre-doctoral students at the dissertation stage were also enrolled in a graduate level seminar devoted exclusively to research issues and problems focused on the specific studies. There has been, thus, continuing discussion and interaction across topical areas and within and across studies. In our view this has proved an invaluable training experience for students and faculty.

Another component of the training effort had to do with colloquia and seminars presented by UCLA faculty or visiting professionals. A number of these seminars were in cooperation with the BEH training program in Special Education. These seminars have proved to be stimulating and enriching. The colloquia have been advertised across the UCLA campus, attracting faculty and students from a number of different departments. Also invited were professionals and REACH Ring Facilities and in other programs in the Los Angeles communities. Colloquium speakers are listed in Table IX-4.

A further contribution to training was the "Visiting Scholar" component. Professor Edward Zigler of Yale University was an in-residence consultant-scholar for REACH for a two-week period, February 17-March 4, 1980. During this period he presented a number of major colloquia, met regularly with REACH staff and subgroups, and provided individual consultation to faculty, post-doctoral, and pre-doctoral researchers. His in-residence consultation provided opportunity for daily in-depth discussion and interaction. Professor Zigler's in-residence status on the UCLA campus proved to be an important training experience for REACH researchers.

An additional formal component of the training program involved a series of seminars set up for REACH Ring Facility agencies. Held once each quarter, the seminars provided opportunity to disseminate information and findings to staff working in actual intervention programs. The seminars also provided opportunity for intervention professionals to bring their "real world" input to REACH researchers. These seminars were attended by pre- and post-doctoral students as well as by REACH faculty. The seminars have proved to be an important aspect of our training efforts and to have influenced both the academically oriented REACH staff members and the service oriented intervention staff members. Names of non-REACH speakers are listed in Table IX-5.

A final training component was the major dissemination conference held by Project REACH at UCLA, March 26-27, 1982. This conference gave many of the students an opportunity to articulate and disseminate their research to a large audience comprised of academicians and professionals in the field.

In sum, training of pre- and post-doctoral students was a major part of REACH. Training experiences included operational level involvement in ongoing studies; continuing in-depth discussion of research issues and problems; instruction in specific techniques and methods; opportunity to hear and interact with major professionals in the field; and, opportunity to influence and to be influenced by intervenors working directly with young handicapped children. The impact of REACH involvement on the professional and research development of young professionals is unquestioned. It is important to note that this impact is not limited to REACH students, as graduate students from other departments and programs on the campus also participated in REACH training activities.

Table IX-1

1977-82 REACH Trainees and Supervising Faculty

Faculty Supervisor	TRAINEES Undergraduate	 Predoctoral	 Postdoctoral
Kenyon Chan	Chiprut, N.	Ackerman, D.	Weigal, R.
		Chan, Y.	Greenspan, S.
		Eldredge, R.	
		Escarsega, Y.	
		Park, H.	
		Smith, D.	
Barbara K. Keogh		Bernheimer, L.	Blacher-Dixon, J.
		Burstein, N.	Das, J.
		Cadwell, J.	Humphrey, M.
		Glover, A.	Kaufman, J.
		Gordon, L.	Kornblau, B.
		Hall, R.	Porges, S.
		Pullis, M.	Sheehan, R.
		Rau, D. C.	Yoshioka-Maxwell, B.
		Watson, P.	
		Young, M.	
Claire B. Kopp	Baker, N.	Balkan, S.	Krakow, B.
		Ballard, M.	Monroe, B.
	Buchman, J.	Johnson, K.	Vaughn, B.
	Doyle, J.	Markowitz, S.	
	Jones, R.	Sirgant, H.	
	Kleve, J. M.	Young, M.	
	Lipkin, G.		
	Melone, M.		
	Maslow, E.		
	Mikami, J.		
	Rosen, J.		
	Weickgenant, A.		
Antoinette Krupski		Barker, Y.	
		Briggs, M.	
		Rein, R. L.	
		Schwalm, C.	
Gerald Mahoney		Amuchie, P.	Crawley, S.
		Finger, I.	Paris, S.
		Schweiger, A.	
		Weller, E.	
Deborah Stipek	Asato, C.	Bailis, P.	Weisz, J.
	Diaz, D.	Felandshere, G.	
	Houston, E.	Diaz, D.	
	Kennedy, C.	Garduque, L.	
		Golub, J.	
		Hoffman, J.	
		Mason, T.	
		Roberts, T.	
		Sanborn, M.	

Table IX-2

Doctoral Dissertations

The following represents dissertations in process or completed under the REACH research program:

Name	Title
Bailis, P. (in process)	Young Children's Judgments About Their Own and Their Peer's Desirability as a Friend
Ballard-Campbell, M. (in process)	Parents' and Teachers' Perception of Academic and Social Competence of Young Handicapped Children; an Attributional Analysis
Bernheimer, L. (complete)	Well Children's Perceptions of Routine Health Care: Coping Behaviors During the Physical Examination
Burstein, N. (complete)	The Effects of Classroom Organization on Preschool Handicapped and Nonhandicapped Children's Experiences in Mainstreamed Settings
Cadwell, J. (complete)	Regression Models of Teacher Judgment and Decision Making
Chan, Y. (complete)	Friendship Comprehension Among Conduct Disorder Boys
Garduque, L. (complete)	Social Encounters Between Preschool Aged Children: The Relationship Between Approach Behaviors and Peer Interaction
Hall, R. J. (complete)	An Information Processing Approach to the Study of Exceptional Children
Hoffman, J. (complete)	The Effects of Academic Success and Failure on Early Grade School Children's Attributions, Expectations and Rewards
Kornblau, B. (complete)	Teachers' Perceptions of the Characteristics of "Idealized Teachable" Pupils
Lavelle, N. (complete)	Parents' Expectations and Causal Attributions Concerning Their Children's Performance on School Related Tasks
Markowitz, S. (complete)	Mother-Infant Interaction with Down Syndrome and Normal Infants
Mason, T. (complete: Masters thesis)	Success and Failure and Children's Approach to School Tasks

Table IX-2 (con't)

Park, H. S. (complete)	Sensitivity to Social Situation: The Development of Children's Social Inference and the Relationships Among Social Inferences, Social Problem-Solving and Social Competence
Pullis, M. (complete)	An Investigation of the Relationship Between Children's Temperament and School Adjustment
Rau, D. C. (complete)	Decisiveness of Disadvantaged Freshmen
Sanborn, M. (in process)	Teacher Effects on Motivation in Pre-School Children
Smith, D. (complete)	Social Problem Solving in Socially Competent and Socially Incompetent Children
Watson, P. (in process)	Decision Making Strategies of School Psychologists for Classification and Placement of Exceptional Children
Weller, E. L. (complete)	A Comparison of Oral and Sign English Communication Training with Down's Syndrome Children in a Parent Assisted Language Intervention Program
Yoshioka-Maxwell, B. (complete)	The Influence of Parents on Teachers' Mainstream Decisions Using a Social Power Framework
Young, M. S. (complete)	Factors Influencing Utilization of Resources and Support Systems by Parents of Handicapped Children

Table IX-3

Current Position of REACH Trainees Completing Program

Name	Position
Ballard, Maurine	Lecturer, Sacramento State University
Bernheimer, Lucinda	Coordinator, REACH, Longitudinal Study
Burstein, Nancy	Postdoctoral Fellowship, UCLA
Cadwell, Joel	Assistant Professor, Rutgers University
Chan, Yvonne	Program Consultant, Los Angeles City School District
Garduque, Laurie	Assistant Professor, Pennsylvania State University
Hall, Robert	Assistant Professor, University of Virginia
Hoffman, Joel	Research Associate, Research Institute for Educational Problems, Cambridge, Massachusetts
Humphrey, Mary	Special Education Consultant, Teaching Tools, Palo Alto, California
Kornblau, Barbara	Special Education Consultant, Los Angeles
Lavelle, Nancy	Administrative Director, Almansor Education Center Alhambra, California
Markowitz, Susan	Postdoctoral Scholar, Children's Hospital, Stanford University
Monroe, Beth	Consultant, Head Start, HEW, Washington, D.C.
Park, Hee-Seo	Director, Korean Education and Research Development Institute, Los Angeles
Pullis, Michael	Assistant Professor, University of Texas, Dallas
Roberts, Theresa	Lecturer, University of California, Los Angeles
Sheehan, Robert	Assistant Professor, Purdue University
Smith, Douglas	Assistant Professor, University of Illinois, Chicago Circle
Weller, Emy Lu	Instructor, Learning Disabilities, Pasadena City College
Yoshioka-Maxwell, Barbara	Community Coordinator, Children's Hospital, Los Angeles
Watson, Phillip	Research Analyst, Juarez Associates, Los Angeles

Table IX-4

Colloquia Speakers

Name	Affiliation
Bell, Richard Q.	University of Virginia
Blank, Marion	Rutgers University
Davis, Scott	University of Michigan
Faust, Margaret	Scripps College
Garbarino, James	Boys' Town, Nebraska
Greenspan, Stephen	University of Illinois
Grossman, Herb	University of California, Los Angeles
Hagen, John	University of Michigan
Heller, Sheri	Huron Institute
Kaufman, James	University of Virginia
MacMillan, Donald	University of California, Riverside
Pledgue, Thomas	Delaware State Department of Education
Porges, Stephen	University of Illinois
Prior, Margot	Latrobe University, Australia
Pullis, Michael	University of Texas, Dallas
Robinson, Nancy	University of Washington
Sheehan, Robert	Purdue University
Swanson, Lee	University of Northern Colorado
Tarjan, George	UCLA Mental Retardation Program
Weinberg, Lois	University of California, Los Angeles
Zigler, Edward	Yale University

Table IX-5

REACH Ring Facility Speakers

Name	Affiliation
Larson, Carole Attorney at Law	Exceptional Children Foundation, Los Angeles
Winton, Pamela, Ph.D.	Carolina Institute for Research on Early Education of the Handicapped
Fristoe, Macalyne, Ph.D.	Purdue University

Part V

INSTITUTE PERSONNEL
1977-1982

Co-Directors	University/Departmental Affiliation	Period of Tenure
Barbara K. Keogh, Ph.D.	UCLA/Education	1977-1982
Claire B. Kopp, Ph.D.	UCLA/Education	1977-1982
Faculty Research Staff		
Kenyon S. Chan, Ph.D.	UCLA/Education	1977-1981
Patricia Greenfield, Ph.D.	UCLA/Psychology	1978-1979
Antoinette Krupski, Ph.D.	UCLA/Education	1977-1982
Gerald Mahoney, Ph.D.	UCLA/Education	1977-1980
Deborah Stipek, Ph.D.	UCLA/Education	1977-1982
Associate Research Staff		
Lucinda P. Bernheimer, Ph.D.	UCLA/Education	1978-1982
Lynne Cook, Ph.D.	UCLA/Education	1978-1980
Susan B. Crawley, Ph.D.	UCLA/Education	1978-1979
Stephen Greenspan, Ph.D.	UCLA/Education	Summer 1978
Barbara Kornblau, Ph.D.	UCLA/Education	1978-1981
Joanne B. Krakow, Ph.D.	UCLA/Education	1978-1982
Robert J. Sheehan, Ph.D.	UCLA/Education	1978-1980
Brian Vaughn, Ph.D.	UCLA/Education	1979-1981
Post-Doctoral Scholars		
Jan Blacher-Dixon	UC Riverside/Education Counseling	Summer 1978
Mary Humphrey	UCLA/Education	1978-1980
Elizabeth Monroe	UCLA/Education	1978-1980
John Weisz	UCLA/Education	Summer 1979
Marlene S. Young	UCLA/Education	1980-1982
Barbara Yoshioka-Maxwell	University Illinois/Education	1979-1981

Advisory Group Members

Name	Affiliation	Tenure
Ira J. Gordon, Ph.D.	University of North Carolina	1977-1979 (deceased)
Wendell Jeffrey, Ph.D.	UCLA/Psychology	1977-1982
Richard Koch, M.D.	Children's Hospital of L.A.	1977-1982
Donald MacMillan, Ed.D.	UC Riverside	1977-1982
Richard Shavelson, Ph.D.	UCLA/Education	1977-1982
George Tarjan, M.D.	UCLA/Mental Retardation	1977-1982

Ad Hoc Advisors: UCLA

Name	Department	Tenure
Howard Adelman, Ph.D.	Psychology	1977-1982
Eva Baker, Ph.D.	Graduate School of Education	1977-1982
Leigh Burstein, Ph.D.	Graduate School of Education	1977-1982
Norma D. Feshbach, Ph.D.	Graduate School of Education/Psychology	1977-1982
Steven Forness, Ph.D.	Neuropsychiatric Institute	1977-1982
Judith Howard, Ph.D.	Pediatrics	1977-1982
Madeline Hunter, Ph.D.	University Elementary School	1977-1982
Arthur H. Parmelee, M.D.	Child Development/Pediatrics	1977-1982
Bernard Weiner, Ph.D.	Psychology	1977-1982

Ad Hoc Advisors: External

Fran E. Chasen	Exceptional Children's Foundation, Los Angeles, California	1977-1982
Evis Coda, Ph.D.	Kennedy Child Study Center, Santa Monica, California	1977-1982
Genny Donlon, M.A. Gail Klynn, M.A.	Park Century School, Santa Monica, California	1977-1982
William L. Faust, Ph.D.	Department of Psychology Claremont College, California	1977-1982
Patricia Gándara, Ph.D.	Sacramento, California	1977-1982
Mario Pascale, Ph.D.	Frostig School, Los Angeles, California	1977-1982
Estelle Shane, Ph.D. Martha Lyon, Ph.D.	Center for Early Education, Los Angeles, California	1977-1982
Melinda Welles, Ph.D.	Atwater Park Center, Los Angeles, California	1977-1982

Ad Hoc Consultants

Name	Affiliation
Heidelise Als, Ph.D.	Harvard Medical School, Children's Hospital Medical Center, Boston
Richard Q. Bell, Ph.D.	University of Virginia/NIMH
Barry Brazelton, M.D.	Boston Children's Hospital, Massachusetts
Diane Bricker, Ph.D.	University of Oregon
Justin Call, M.D.	College of Medicine, University of California, Irvine, California
Stella Chess, M.D.	New York University Medical Center
Victor Denenberg, Ph.D.	University of Connecticut, Department of Behavioral Sciences
Sybille Escalona, Ph.D.	Albert Einstein College of Medicine, Yeshiva University, New York
Richard Eyman, M.D.	Pacific State Hospital, California
James Gallagher, Ph.D.	University of North Carolina at Chapel Hill
Stephen Greenspan, Ph.D.	Boys' Town Research Center, Omaha Nebraska

Ad Hoc Consultants (con't.)

Name	Affiliation
Herbert Grossman, M.D.	UCLA, Department of Psychiatry
Jane Hunt, Ph.D.	University of California, Berkeley
Judith Howard, M.D.	UCLA, School of Medicine
Dorothy Huntington, Ph.D.	Center for Family in Transition, Corte Madera
Barbara Korsch, M.D.	University of Southern California, School of Medicine, and Children's Hospital, Los Angeles
Carol Larson, Attorney-at-Law	Exceptional Children's Foundation, Los Angeles, California
Robert J. McCall, Ph.D.	Boys Town, Nebraska
Edward Mueller, Ph.D.	Boston University, Department of Psychology
Gloria Powell, M.D.	Neuropsychiatric Institute, UCLA
Harriet Rheingold, Ph.D.	University of North Carolina, Department of Psychology
David Rogosa, Ph.D.	University of Chicago, Department of Education
Arnold Sameroff, Ph.D.	University of Illinois at Chicago Circle
Melvyn Semmel, Ph.D.	UC Santa Barbara, Graduate School of Education
Nancy Shosenberg, R.N.	Department of Psychiatric Research, Toronto, Canada
L. Alan Sroufe, Ph.D.	Institute of Child Development, University of Minnesota
Arthur Silverstein, M.D.	Pacific State Hospital, California
Evelyn Thoman, Ph.D.	University of Connecticut, Department of Biobehavioral Sciences
Alexander Thomas, Ph.D.	New York University Medical Center
Theodore J. Tjossem, Ph.D.	National Institutes of Health, Washington, DC
Edward Zigler, Ph.D.	Yale University, Department of Psychology

Project REACH Review Conference - January 21-23, 1980

Review Panel

Byron Egeland, Ph.D.	University of Minnesota, Department of Psychoeducational Studies
Doris J. Johnson, Ph.D.	Northwestern University, Learning Disabilities Program
Lewis P. Lipsitt, Ph.D.	Brown University, Department of Psychology
Nancy M. Robinson, Ph.D.	University of Washington, Department of Psychiatry and Behavioral Sciences, Department of Psychology

Research Assistants

Faculty Advisor	Name	University/Affiliation	Tenure
Barbara K. Keogh	M. Ballard	UCLA/Special Education	1980-1981
	N. Burstein	UCLA/Special Education	1980-1981
	J. Cadwell	UCLA/Education-Research Methods	1978-1979
	L. Gordon	UCLA/Education	1980-1982
	R. Hall	UCLA/Special Education	1978-1979
	M. Pullis	UCLA/Special Education	1977-1980
	D. C. Rau	UCLA/Education-Research Methods	1980-1982
	P. Watson	UCLA/Special Education	1977-1980
	A. Weiss	UCLA/Special Education	1978-1979
	A. G. Wilcoxen	UCLA/Special Education	1978-1982
	B. Wright	UCLA/Education-Counseling	1980-1981
	B. Yoshioka-Maxwell	UCLA/Special Education	1979-1980
	M. Young	UCLA/Special Education	1978-1980
Claire B. Kopp	N. Baker	UCLA/Psychology	1978-1981
	S. Balkan	UCLA/Sociology	1978-1980
	J. Doyle	UCLA/Psychology	1981-1982
	K. Johnson	UCLA/Psychology	1978-1982
	J. M. Kleve	UCLA/Psychology	1978-1980
	V. Lal	UCLA/Psychology	1981-1982
	M. Lee	UCLA/Education-Early Childhood	1979-1982
	S. Markowitz	UCLA/Special Education	1978-1980
	D. Parham	UCLA/Special Education	1981-1982
	A. Weickgenant	UCLA/Psychology	1978-1982
	S. Wolf	UCLA/Psychology	1978-1979
	B. Yoshioka-Maxwell	UCLA/Special Education	1978-1979
	M. Young	UCLA/Special Education	1978-1980
Kenyon Chan	D. Ackerman	UCLA/Special Education	1980-1981
	R. Bolus	UCLA/Education-Research Methods	1979-1980
	Y. Chan	UCLA/Special Education	1978-1981
	R. Eldridge	UCLA/Special Education	1978-1982
	Y. Escarsega	UCLA/Special Education	1979-1981
	L. Garduque	UCLA/Education-Early Childhood	1978-1979
	J. Hamilton	UCLA/Education	1978-1981
	H. S. Park	UCLA/Education-Research Methods	1978-1980
	D. Smith	UCLA/Special Education	1978-1980

Research Assistants (con't.)

Patricia Greenfield

B. Skarakis	UCLA/Psychology	1978-1979

Antoinette Krupski

S. Auman	UCLA/Special Education	1978-1979
Y. Barker	UCLA/Special Education	1980-1982
M. Briggs	UCLA/Special Education	1980-1982
L. Carpenter	UCLA/Special Education	1981-1982
P. Evans	University of London	1979-1980
R. Lang	UCLA/Psychology	1978-1979
L. Pring	Medical Research Council, London	1979-1980
R. L. Rein	UCLA/Special Education	1980-1982
L. Rose	UCLA/Sociology	1978-1979
C. Rubenstein	UCLA/Special Education	1980-1982
C. Taylor	Teacher, London, England	1979-1980

Gerald Mahoney

P. Amuchie	UCLA/Special Education	1979-1980
I. Finger	UCLA/Special Education	1978-1980
G. Saika	UCLA/Special Education	1978-1979
A. Schweiger	UCLA/Education	1978-1980
E. L. Weller	UCLA/Special Education	1978-1979

Deborah Stipek

G. Delandshere	UCLA/Education-Research Methods	1979-1981
D. Diaz	UCLA/Theatre Arts	1978-1982
J. Hoffman	UCLA/Special Education	1978-1980
T. Mason	UCLA/Education-Early Childhood	1979-1981
S. Resnick	UCLA/Psychology	1978-1979
T. Roberts	UCLA/Education-Early Childhood	1978-1981
M. Sanborn	UCLA/Education-Counseling	1978-1982
L. Tannett	UCLA/Early Childhood	1978-1979

Longitudinal Project

M. Bertenthal	Community Coordinator	1978-1979
S. Castillo	Community Coordinator	1979-1980
A. Minors	Asst. Longitudinal Co-ordinator	1980-1982
S. Hertz	Longitudinal Assistant	
D. C. Rau	Longitudinal Assistant	1979-1982
P. Stuppy	Longitudinal Assistant	1978-1981

Statistical

B. Berthenthal	Statistician	1978-1979
W. Keesling	Statistician	1979-1980
C. Lum	Statistician	1979-1980
E. Markowitz	Statistician	1978-1979
W. Pankey	Statistician	1978-1979
B. Powell	Statistician	1979-1980
J. Wingard	Statistician	1979-1982

Short-term Research Aides

Name	Tenure	Name	Tenure
G. Barnes	1980-1981	C. Kennedy	1979-1980
S. Behar	1978-1979	F. Mehlman	1981-1982
D. Carhill	1979-1980	T. N. Nield	1979-1980
J. Cohen	1979-1980	O. Peters	1979-1980
B. P. Green	1978-1979	H. Sirgant	1980-1981
M. Gutkowski	1978-1980	L. Snyder	1979-1980
P. Kaplan	1979-1980	M. T. Tannett	1978-1979
C. Kennedy	1979-1980	A. Yellin	1979-1980

Support Staff

Administrative/Secretarial

Name	Position	Tenure
J. M. Rutberg	Project Manager	1978-1982
A. Detlev	Administative Assistant	1978-1981
B. Hillman	Administrative Assistant	1981-1982
D. Ernstoff	Secretary	1981-1982
K. Carr	Secretary	1977-1982
M. Cranor	Secretary	1978-1979
J. Gentry	Secretary	1978-1979
M. Kirkhart	Secretary	1977-1979
M. Oshita	Secretary	1979-1981

Bibliographic

H. Crane	Bibliographer	1979-1980
A. Fine	Bibliographer	1979-1980
G. Geiser	Bibliographer	1980-1982
S. Jean	Bibliographer	1979-1980
L. Moore	Bibliographer	1979-1980
M. Schiffman	Bibliographer	1978-1979
C. Solomon	Bibliographer	1978-1980
J. Zerg	Bibliographer	1979-1981

Part XI

INSTITUTE IMPACT

The evaluation of any endeavor, whether it be research, service, or legislative, requires a perspective afforded by time. So too, an evaluation of the impact or effectiveness of the Early Childhood Institutes will best be measured in years rather than in weeks. However, since the Office of Special Education has asked us to evaluate the impact of our program, in this section we attempt to gauge the effect of five years of Project REACH.

One approach to demonstrating program impact is to refer to the Research Findings and Implications section or the Product List of this report. REACH investigators have been active in producing written material and in presenting their research at conferences and professional meetings. While an additive model provides certain kinds of information, the summarizing numbers may not in the long run reflect important aspects of impact. In our view the experiences in REACH have had far reaching effects on several sets of people: REACH faculty and students; colleagues in the University; professionals in the academic and research field; intervenors, teachers, and other professionals at the service delivery level; and, parents and families. These areas of impact deserve some brief discussion.

It has been said that every experience affects the participant in some way; certainly, the experiences of REACH have influenced us and have had an impact on our thinking. We begin this section by describing some of these influences upon Project REACH personnel.

First, there has been a heightened awareness of young at-risk and handicapped children. All of the faculty, researchers, students, and teachers at UCLA who were directly or indirectly involved with REACH are far more cognizant of these children and their families than ever before. For many in the Division of Special Education, REACH presented the first opportunity to be involved with a very young population of exceptional children. It soon became apparent that the abilities and needs of the young handicapped differed consdierably from the school age "special education child." Further, exposure brought a high level of consciousness about issues that ranged from practical day-to-day problems encountered by families to the most sophisticated research issues.

Concern for the complexity of early risk and handicapping conditions is reflected in the content of course work offered within the special education and early childhood education training programs and in the theses and dissertations undertaken by graduate students. It is also reflected in a changed emphasis in faculty research. REACH has provided the impetus for study of young handicapped children and their families. We expect this research to continue and to be elaborated over the next years through the research and service activities of former REACH staff and students.

A second kind of impact revolved around dissemination. The importance of disseminating information beyond the usual scholarly routes became apparent. In our dealings with practitioners and parents it was obvious that they wanted practical and useful information. We had to learn to communicate with and disseminate research findings to colleagues who provide care and education to children, to parents who have concerns about specific children, and to the public at large who support these research endeavors. Recognition of the need for dissemination to applied audiences led to different writing and presentation strategies and styles, and to allocation of effort and resources directed at communicating with these audiences. In addition, as we began to understand the need for dissemination on various levels, we also began to appreciate the complexity of the process and product of dissemination. We necessarily began to think in terms of the "how" of information transmission, relative to selected target groups. For example, research colleagues demand considerable detail about data or research issues; parents, on the other hand, want the gist of findings without details. As researchers new to the dissemination operation, we found it necessary to organize ideas about dissemination procedures and to direct information to the appropriate channels. In a sense the process of dissemination served a "consciousness raising" function, having an important effect on REACH researchers' views about their work and to whom it should be directed.

Still another area of impact for us occurred in the domain of research. As we conducted studies with children who were at-risk or handicapped, we increasingly appreciated the complexities of studying these children. They and their environments are diverse, their needs are not easily categorized, and their strengths and problems are varied. How to study risk and handicapped children in order to obtain findings that are interpretable and generalizable has been a continuing challenge.

We have also become increasingly cognizant of the complex ethical issues that have arisen in our dealings with families in our research projects. Parents have willingly shared time, ideas, and questions with us. Parents of handicapped children have revealed particular strengths and stresses as they described their experiences, their children, and their attempts to cope with numerous problems. We have been enormously impressed with the resiliency of the families of handicapped children and with their commitment to their children and to our research. Our involvement with study families also raised many ethical questions. How much information should be provided when research findings are preliminary? How sure can we be of the robustness of data? Should service resources be made available to parents, even though the primary responsibility of the project was research? These questions and others intensified and broadened our concern about research ethics. Some of these concerns have begun to be reflected in course work on the UCLA campus and in professional presentations. In sum, the experiences in REACH have influenced our research staff in significant and enduring ways.

A different kind of influence or effect relates to the impact REACH has had on faculty and students within the Graduate School of Education and in other departments on the UCLA campus. This has been a highly visible project which has attracted the interest of faculty and students from a variety of disciplinary and methodological perspectives. The content of REACH studies has made other faculty more knowledgable about and sensitive to the problems of special populations, changes which are already reflected in the content of their own courses. The research methodology group within the School of Education has been particularly interested and helpful in REACH work, some of those faculty now working in active collaboration with special education faculty and students in bringing their expertise to bear on new studies with handicapped children. Clearly one effect of REACH has been to interest other faculty, students, and staff in the study of young children with handicaps.

Going beyond UCLA personnel, we know that many of our research endeavors have resulted in findings that have interested and influenced colleagues in the field. Some of these are discussed below. First, there is a better understanding of child characteristics than existed heretofore. Because REACH focused so intensively on studies of the at-risk and handicapped young child's functioning, we were able to broaden the understanding of certain facets of cognitive, social, and temperamental domains of performance. Developmental trends and the correlates of individual differences have been identified. Whether the findings related to the emergence of self-control, the interactive role of attention and memory, or the fact that within group variance in temperament and the organization of the intervention program are related to children's ability to be effective in schools, the information has spurred additional research by colleagues, and is now being used by educators and clinicians in interventions. In both Infant/Toddler and Preschool research programs we have developed new and useful measures and techniques. Documentation of progress work has yielded refined models for evaluating child change, and both the Support Systems and Longitudinal Studies have led to better understanding of family needs and stresses. Examination of the product list in Section VII of this report provides evidence of the wide impact through professional publication and presentation.

We know, also, that our products have had an impact on a more concrete level. A number of REACH's products and/or research instruments have been disseminated widely in response to requests from individuals working in the field. Over 2,000 reprints or papers have been sent upon request.

Training has been an integral part of Project REACH's activities from the very first days of the Project, because a network of students and postdoctoral scholars have been involved in our endeavors. There is already evidence that students have carried some of our best ideas and research to their new responsibilities, and that they in turn have initiated new sets of studies. Sheehan, now at Purdue University, has received a NSF award and will continue to work on documentation of progress; Vaughn, now at the University of Illinois and the Illinois Pediatric Institute, is involved in further studies of infancy; Pullis and Cadwell, in different parts of the country, have continued their collaborative research on temperament; Bernheimer and Young are involved in followup research with families, and Ballard-Campbell is expanding her attribution research, the latter researchers seeking support from the California State Department of Education research funds. In our view the active and growing research programs of REACH students and staff are evidence of the impact of the program as a whole.

We have also been involved in less formal training with teachers, intervenors, and clinicians in the community. As a result of these seminars and training sessions we are aware that colleagues working in the field have gained in knowledge and competence. Further, we perceive attitudinal changes. A healthy skepticism has emerged in their thinking; they are less prone to accept information as "a given." That we are repeatedly asked back after giving workshops and seminars suggests that the sessions were useful.

Finally, we know that we have been effective in establishing stronger ties between researchers and parents, particularly parents of handicapped children. Such a working liaison is almost essential in continuing research. The information that parents have shared with us can be a springboard for future research, and at the same time, the information that we have gained about their children and shared with them has either affirmed what they suspected or expanded the knowledge they had about their children. Because of this interchange, we find that parents have become more articulate and confident. They are more challenging of professinals and appear less afraid to be advocates for their children. This growth can only bode well for the future of their children.

Part XII

APPENDIX

List of Appended Items

1. Ballard, M., & Kopp, C. B. *The autonomous self: Social-affective development in infancy*. Project REACH Working Paper, UCLA, 1978.

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Documents Planned or In Preparation

Keogh, B. K. Four and five year old temperament study. In preparation.

Keogh, B. K., Cadwell, J., Yoshioka-Maxwell, B., Wilcoxen, A. G., & Wright. Temperament vignette studies. In preparation.

Keogh, B. K., & Burstein, N. Temperament-teachability study. In preparation.

Keogh, B. K., & Burstein, N. Temperament-teachability-behavioral observation. In preparation.

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